University of Alberta

Exploring the Role of Medical and Consumer Literature in the Diffusion of Information Related to Hormone Therapy for Menopausal Women

by

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ABSTRACT

Using content analysis, this study explored the impact of new information on medical and consumer articles, and the role of the literature in the diffusion of new information; the influence of the literature on the innovation-decision process; the expression of biomedical vs. normal life transition models, and of medicalization within the literature; and evidence of industry influence on publications. "Diffusion of Innovations" and "Strength of Weak Ties" theories provided a framework within which to view the function of published material, and changing practices related to hormone therapy for menopausal women provided context for the study. Findings suggest that published literature plays an integral role in the diffusion of innovations; that medical and lay articles are not neutral channels, they function to shape information and produce meaning; and that information professionals and readers should be aware that philosophical underpinning impacts information.

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CHAPTER 1

INTRODUCTION

The transformation, within a few years, of a formerly pleasant, energetic woman into a dull-minded but sharp-tongued caricature of her former self is one of the saddest of human spectacles . . . and the supreme tragedy is that, in the light of present medical possibilities, all this is unnecessary.

Robert A. Wilson, *Feminine Forever*

In 1966, New York gynecologist, Dr. Robert Wilson, penned the words that promised every woman the option of remaining 'feminine forever.' Promoting the concept that menopause produced an estrogen deficiency of such proportions that a woman's entire social, psychological and physical well-being was doomed, Wilson promised the elimination of menopause, a return to youthful vigor, the indefinite postponement of the ravages of aging, and the final physical and mental emancipation of women. The fundamental concept that menopause was a "deficiency disease" (Bell 1987, 535), which required medical intervention in the form of hormone therapy (HT), remained until July 2002, when the esteemed *Journal of the American Medical Association* (*JAMA*) dropped a bombshell which reverberated across medical and consumer publications and into doctor's offices and living rooms – HT had been found to have more potential for harm than for good in healthy postmenopausal women taking a combination of estrogen and progesterone to prevent chronic disease (Rossouw et al. 2002).

Although to many physicians and women the research findings published in *JAMA* in mid-2002 appeared to come as a surprise, HT as a long-term preventative therapy for menopausal and postmenopausal women was a treatment innovation that had emerged and developed over time. Prescribing doctors and HT users had, perhaps unconsciously, gone through a decision-making process which entailed elements of the following: they had gathered information about long-term HT, through reading and contact with others they had been persuaded of the value of this treatment innovation, they had made a decision to adopt or reject this therapy, and following adoption they may have re-evaluated their actions if anything unexpected occurred. With the premature publication of results from the Women's Health Initiative (WHI) study (Rossouw et al. 2002), something totally unanticipated did occur and for some, the resulting dissonance has caused not only a re-evaluation of HT, but also a re-evaluation of the concept that women's bodies have innate physical flaws that require medical intervention.

1.1 PUBLISHED LITERATURE AND CHANGE

Much has been written about the diffusion of technological innovations; however, research exploring the role of medical and consumer literature within the *innovation-decision process* (I-D process), and the role of published articles in the diffusion of information related to innovation is limited. Although Rogers (1995) observed that interpersonal influences primarily stimulated behaviour change, the dissemination of information via various communication channels is an essential element of the diffusion process. A recent focus within diffusion research on "communication channels and the diffusion context" (Oldenburg, Hardcastle, and Kok 1997, 275), the considerable dissonance caused by the WHI, and the widespread coverage of WHI findings in medical and consumer publications, raised important questions about the role of published literature in change.

In medical fields, innovation is commonly characterized by an exchange of information in various publications. Eventually, the accumulation of information, an articulation of facts, editorial opinions and beliefs related to a new discovery or idea, provides the impetus needed to counter a previously held belief, alter a current medical procedure, or institute a new practice. While the transition from 'promising report' to 'standard practice' might be envisioned as a simple, sequential process, the I-D process can be complicated by innovation adoption prior to the accumulation of adequate clinical research upon which to make an adoption decision (McKinlay 1981). By utilizing theoretical frameworks from other disciplines, such as Rogers' *Diffusion of Innovations* theory (Rogers 1995), librarians working in scientific fields can gain an understanding of the relationship between published literature, innovation, and change.

1.2 SPECIFIC RESEARCH PROBLEM

The objective of this exploratory study is to investigate the role of published literature in the diffusion process (Rogers 1995) of HT as a long-term preventative therapy. While the use of HT for the prevention of potential, future maladies had been widely adopted as an appropriate therapy for menopausal and postmenopausal women, emerging evidence, which demonstrated negative sequelae or lack of therapeutic benefit (Rossouw et al. 2002; Wassertheil-Smoller et al. 2003; Shumaker et al. 2003; Rapp et al. 2003; Hodis et al. 2003; Manson et al. 2003; Cauley et al. 2003; Anderson et al. 2003), has resulted in significant dissonance and recommendations to discontinue this treatment innovation. This study focused on the impact of the early publication of the WHI study on medical and consumer articles. In addition, the role of the literature in the I-D process both prior to and following the publication of the WHI findings was explored. Using Granovetter's *Strength of Weak Ties* (SWT) theory (Granovetter 1973), the impact on the I-D process by the varying ties through which information flows was examined.

Medical and consumer literature is both shaped by and shapes views towards the menopause. The biomedical model and a medicalized view of this life stage have come to dominate health-related discussions for middle-aged and older women. This study considered the expression of the biomedical vs. normal life transition models within literature relating to menopause and HT, as well as the relationship between published literature and the medicalization of this life stage. Evidence within the literature of commercial forces that seek to shape the attitudes of physician and consumer populations was also explored.

1.3 THEORETICAL FRAMEWORK

The theoretical frameworks, which informed this exploratory study, came from Everett M. Rogers' *Diffusion of Innovations* theory (Rogers 1995) and Mark Granovetter's *Strength of Weak Ties* (SWT) theory (Granovetter 1973). Please refer to the literature review for further details relating to these theories.

1.4 RESEARCH QUESTIONS

Using content analysis of a random sample of medical and consumer articles, this exploratory study addressed the following research questions:

1. How did the published results of the WHI study influence medical and consumer literature and what role did the literature play in the I-D process related to HT as a long-term preventative therapy for menopausal and postmenopausal women?
2. Given that published literature provides a conduit through which information flows within and between networks, what role did varying tie strength and the presence of 'weak trusted ties' play in the I-D process?
3. How has the WHI study impacted the expression of the biomedical model vs. normal life transition model within the literature?
4. How was the medicalization of menopause expressed in the sample of medical and consumer articles?
5. Given the acknowledged impact of industry in medicine, how did industry influence articles in the sample?

1.5 THESIS OUTLINE

This study begins in chapter two with a literature review that takes the following format: an overview of the illustrative medical-innovation case chosen to give context to this study is provided and the impact of WHI results on long-term preventative HT is discussed; two theories, Everett M. Rogers' *Diffusion of*

Innovations theory (Rogers 1995) and Mark Granovetter's *Strength of Weak Ties* (SWT) theory (Granovetter 1973), are examined with emphasis on the place of information transmission within the context of the theories; the meaning of menopause as it is elucidated by the biomedical and normal life transition models. and the medicalization of this life stage is explored; literature illuminating the influence of industry on research, academia, clinicians and the public is reviewed; and finally, menopause research utilizing content analysis is surveyed. In chapter three the methods used in this exploratory study are detailed, and in chapter four, results and ensuing discussions from each of the research questions are presented. Chapter five concludes with a summary of results, theoretical and practical implications of the study's findings, and further research questions raised by the content analysis of medical and consumer articles related to menopause and long-term preventative HT.

CHAPTER 2

LITERATURE REVIEW

Before embarking on an investigation of the role of medical and consumer articles in innovation and change, it was valuable to consider what had been published in the research and consumer health literature about HT, social network theories, the meaning of menopause, the influence of industry in the medical arena, and previous use of content analysis in this area of inquiry. The following literature review begins with an overview of the illustrative medical-innovation case and its context within published literature: the evolution of exogenous, therapeutic hormone use for women in the menopause or postmenopause and the popularizing of the medical management of this life stage is briefly reviewed; the emergence of HT as a long-term preventative therapy is discussed; and literature related to the influence of and response to the Women's Health Initiative (WHI) study is explored. Rogers' Diffusion of Innovations theory (1995) is examined with particular focus on the innovation decision (I-D) process, innovation attributes, communication channels and networks, diffusion research in medical fields, and the role of published literature within the context of this theory. This is followed by discussion of Granovetter's Strength of Weak Ties (STW) theory (1973), specifically, discussion of weak vs. strong ties, the SWT theory operationalized within the context of this thesis study, and the role of published literature as a bridging weak tie. In order to provide background for content analysis related to the biomedical and normal life transition approaches to medical management, the meaning of menopause is investigated within the context of these two models, and the medicalization of menopause as an outgrowth of the biomedical model is explored. Finally, the influence of industry on research and clinical medical practice, particularly as it relates to long-term preventative hormone therapy (HT), is reviewed, and menopause research utilizing content analysis is presented.

2.1 ILLUSTRATIVE MEDICAL-INNOVATION CASE AND ITS CONTEXT WITHIN PUBLISHED LITERATURE

On July 8, 2003 the estrogen plus progestin trial within the Women's Health Initiative (WHI) study was prematurely halted when the data and safety monitoring board determined that the "overall health risks exceeded benefits from use of combined estrogen plus progestin for an average 5.2-year follow-up among healthy postmenopausal US women" (Rossouw et al. 2002, 321). Over the next year, as further WHI findings about HT (Anderson et al. 2003; Cauley et al. 2003; Rapp et al. 2003; Shumaker et al. 2003; Wassertheil-Smoller et al. 2003) and other studies (Hodis et al. 2003; Manson et al. 2003) were published in the medical literature and closely followed in the lay press, it became increasingly clear that "many people [had] suspended ordinary standards of evidence concerning medical interventions and concluded that hormone therapy was the right thing" (Herrington and Howard 2003, 519). While it is now clear that HT cannot be recommended for disease prevention (Fletcher and Colditz 2002), this therapy continues to be recommended as short-term intervention for women suffering from menopausal symptoms (Blake et al. 2002), the use of estrogen for women with hysterectomies remains under study by the WHI, and some writers in medical journals continue to express ambivalent feelings about WHI findings and related studies (Bailar 2003; Reid 2002). Because the unanticipated findings of the WHI represented a dramatic departure from the accepted and articulated view of menopause as a treatable, medical condition, an overview of this illustrative case provides a basis for exploring the role of the literature in the I-D process (Rogers 1995) of HT as a long-term preventative therapy for menopausal and postmenopausal women.

2.1.1 Exogenous Hormones as Therapy

The study of hormones emerged as a significant field of research at the turn of the twentieth century when physicians suggested that the "internal secretions of certain organs were crucial to an understanding of physical processes in the human body" (Oudshoorn 1990, 6) and pharmaceutical companies began having some success in producing ovarian and testicular preparations. Advertising in the pages of medical journals at this time indicated a thriving trade in these preparations of "biologicals" (Oudshoorn 1990, 8). While in the nineteenth century physicians viewed menopause through their understanding of women's biological characteristics and social roles (White and Schilling 2000) and perceived this stage of life as a "physiological crisis, which could lead either to tranquility or disease depending on a woman's prior behaviour and predisposition to malignancy" (Bell 1987, 536), the view of menopause as a treatable condition required, on a conceptual level, a theory of etiology. This was provided in the early twentieth century when researchers developed theories about the role of hormones as well as the tools for research on hormones. The availability of substances that could be used in clinical research and clinical practice further facilitated the transformation of menopause into a medical problem with a medical solution (Bell 1987).

With the discovery in 1930 that the urine of pregnant mares provided an accessible and inexpensive source of female sex hormones (Oudshoorn 1990), the commercial production of these hormones became a reality and gynecology clinics became the means by which this "product in search of a market" (Coney 1994, 9) found an established clientele. In the late 1930s and 1940s, descriptions of menopause as a deficiency disease began to appear in scholarly articles, as well as recommendations for estrogen 'replacement' (Bell 1990). In an analysis of articles published in Finland during the early 1950s, however, Topo (1997) found that although medical articles expressed concerns about the increasing clinical use of HT in the absence of related knowledge, the menopause was still portrayed in both medical and consumer articles as a normal and natural phase in a woman's life.

2.1.2 Popularizing the Medical Management of Menopause

In 1966, the book *Feminine Forever* (Wilson 1966) popularized the view that menopause produces an unnatural state of estrogen deficiency that can be effectively eliminated with HT. This book, which assured doctors and women that the physical and mental debilitation inflicted by menopausal "castration" and the accompanying "horror of this living decay" (Wilson 1966, 43) could be overcome by estrogen therapy, became a best seller in both the United States and Europe. A 1969 survey in five European countries found that "the popularity of *Feminine Forever* directly influenced the extent to which hormone therapy was used in each country" (Love 2003, 35). It is interesting to note that two years before this book was written, the author's private foundation, the Wilson Foundation, received over $31,000 from a number of pharmaceutical companies, all of which made the hormones that Wilson promoted for the treatment of menopause (Love 2003). This sum is equivalent to approximately $176,485 in purchasing power today (Seaman 2003). While Wilson's book enthusiastically promoted ubiquitous, long-term postmenopausal use of estrogen, samples of the medical and consumer literature in the 1960s suggested a positive view of HT as a preventative treatment for menopausal symptoms, but a cautious view of its long-term use (Topo 1997).

2.1.3 Hormones as Preventative Therapy

By the mid-1970s, estrogen was being widely used to treat menopausal symptoms such as hot flashes and mood swings; however, studies showing that estrogen could lead to endometrial cancer raised alarm and prescriptions for the estrogen medication, Premarin, fell from 28 million in the United States in 1975 to 14 million in 1980 (Love 2003). In the 1980s, prescriptions of HT began to increase again as estrogens were combined with the oral progestin Provera, which had been shown to protect the uterus from cancer, and the link between menopause and osteoporosis was aggressively marketed to both clinicians and the public (Kaufert and Lock 1997; Palmlund 1997a).

Although previously an ignored condition, the media was effectively used to portray osteoporosis as a debilitating, crippling disease, linked with the postmenopausal years in such a way that "osteoporosis practically [became] identified as a symptom of menopause" (Worcester and Whatley 1992, 9). The alleged inevitable fate of women not taking HT after menopause was eloquently demonstrated by ads showing healthy, middle-aged women transformed into stooped old women, x-rays of crooked spines, and pitiful-looking women with dowager's humps (Love 2003; Worcester and Whatley 1992). It is interesting to note that the osteoporosis-menopause link has been challenged by variation in fracture rates among different racial and ethnic groups, across nation, and over time (Meyer 2001). With the 1986 United States Food and Drug Administration (FDA) announcement that the rate of bone loss in postmenopausal women could be reduced by taking estrogens (Stadel, Colman, and Orloff 2003), however, HT gained the momentum it had lost in the 1970s and prescriptions began to climb once again. The frequency of menopause-related, medical and consumer articles increased in the 1980s and, in most texts, the menopause was now explicitly or implicitly identified as a deficiency disease (Topo 1997).

In the 1990s a second potential indication for HT began to be actively promoted: HT as a means of reducing heart disease in women. Over this decade it became "perceived knowledge that estrogen was cardioprotective" (Seaman 2003, 162), although there were no studies clearly demonstrating a connection between reduced endogenous estrogen and heart disease (Meyer 2001). This association between HT and protection from cardiovascular disease occurred in spite of the FDA's 1990 refusal of a Wyeth-Ayerst request for approval of Premarin, a form of HT, as preventative therapy for heart disease in women who had already had a hysterectomy (National Women's Health Network 2002).

Observational studies, which suggested an increased risk of coronary disease following natural menopause (Stampfer, Colditz, and Willett 1990), were widely used to promote the alleged cardioprotective capability of exogenous estrogen. As a result of research demonstrating that HT affected specific cardiovascular risk factors (HT was shown to lower levels of low-density lipoprotein cholesterol and increase levels of high-density lipoprotein cholesterol (Herrington and Howard 2003)) the seemingly logical assumption was made that HT, by decreasing risk factors, would decrease heart disease. Although subsequent analysis threw the interpretations of prominent observational studies into question (it was demonstrated that Framingham Study results were "statistically unstable" and the results of the Nurses' Health Study were found to be insignificant following adjustments for variables such as age and smoking (Stampfer, Colditz, and Willett 1990)), and a recent editorial in the *New England Journal of Medicine* (*NEJM*) pointed out that "the association between a factor and the risk of a disease does not guarantee that drug-induced changes in that factor will produce a corresponding change in the risk" (Herrington and Howard 2003, 520), the results of observational studies and risk factor studies facilitated the promotion of HT for the primary prevention of heart disease.

In 1998 the results of the first large-scale randomized controlled trial (RCT) investigating HT, the Heart Estrogen/progestin Replacement Study, was reported in the *Journal of the American Medical Association* (*JAMA*). This study demonstrated that in a population of postmenopausal women with heart disease there was no difference in heart disease or death between hormone users and nonusers after 4.1 years, although there were more heart attacks and deaths in hormone users during the first two years of the study (Hulley et al. 1998). Despite failing to demonstrate cardiovascular benefit from HT, the clinical significance of this RCT was "disregarded in lieu of the less credible evidence that fit the prevailing paradigm" (Herrington and Howard 2003, 519). It was not until 2001 that the American Heart Association reversed its previous recommendations, which emphasized the alleged protective effects of estrogen, and issued an advisory stating that there was no evidence for using HT to prevent heart disease and that it is contraindicated for women with existing heart disease (National Women's Health Network 2002).

Estrogen's potential impact on brain function became the third primary reason for the prescription of HT. Spurred on by the 1994 publication of an observational study, which concluded that "increased incidence of Alzheimer's disease in older women may be due to estrogen deficiency and that estrogen replacement therapy may be useful for preventing or delaying the onset of this dementia" (Paganini-Hill and Henderson 1994, 256), many began to view the link between aging, dementia and hormonal changes following menopause as "logical and compelling" (Beckmann 1997, 295). The "loss of mental capacity is terrifying for most of us" (National Women's Health Network 2002, 191) and it is, therefore, not surprising that HT as a 'cure' for cognitive dysfunction or as a protection against future dementia became a significant topic of inquiry and dissent in both the medical and consumer literature (Meyer 2001; Love 2003). While molecular biology studies have suggested that estrogen "boosts the [brain] cells' chemical function, spurs their growth, and even keeps them alive by shielding them from toxins" (Wickelgren 1997, 675), comprehensive review articles have concluded that despite "plausible biological mechanisms" (Yaffe et al. 1998, 688) and the results of observational studies, there is insufficient evidence to support assertions that estrogen either prevents or treats Alzheimer's disease and other dementias, or that estrogen improves the cognition of postmenopausal women or women with Alzheimer's disease (Haskell, Richardson, and Horwitz 1997; Yaffe et al. 1998).

Since the 1980s long-term preventative HT has been marketed to prescribing physicians and women largely on the basis of osteoporosis, heart disease, and Alzheimer's disease or cognitive decline (Meyer 2001). Despite the complex factors contributing to these problems, they have been "reclassified as diseases caused by menopause" (Love 2003, 4) and have come to be viewed as *symptoms* of hormone deficiency. The principal rationale for urging healthy menopausal or postmenopausal women to take hormones on a long-term basis thus became the primary prevention of these supposed *symptoms* of menopause (Palmlund 1997a).

During the mid-1990s and until the publication of the WHI results, the language used in many medical and consumer articles projected the view that physicians should promote long-term preventative HT to menopausal and postmenopausal patients, and that this therapy was the wise choice for the prudent woman. Seaman (2003) looked at several major health newsletters published during this time period and notes wording which promotes the assumption that HT is the sensible choice for women. An article in the *Women's Health Watch*, for example, begins by stating: "*By now you're probably well aware* that estrogen is considered to be responsible for our 15 to 20 year advantage over men in evading coronary artery disease" (emphasis added) (Anonymous 1995, 6). Many articles in medical journals used a similarly assumptive tone as they define the menopausal experience of women and promote the role of HT in alleviating "ovarian hormone deprivation": "At this time [menopause] a series of biological transformations takes place and each of those will interfere with the lifestyle and well-being of the last period of a woman's existence" (Genazzani and Gambacciani 2001, S49).

A search in the database Medline combining the subject headings "patient compliance" and "hormone replacement therapy or estrogen replacement therapy" demonstrated that, during this period of time, medical publications emphasized that poor HT continuance was a major barrier in the medical management of menopause (Kaplan et al. 2002; Pitkin 2002; Thompson 1995). Problems with maintaining compliance, which is viewed as both the uptake of recommended therapy and subsequent adherence to that therapy (Hunter, O'Dea, and Britten 1997), is presented to physicians as something that may be effectively overcome through education and the development of new therapeutic regimens and delivery modes (Christiansen 2001; Genazzani and Bernardi 2002; Kenemans et al. 2001; Pitkin 2002; Session and Jewelwicz 1993). Topo (1997) notes that in the 1990s, as debate about HT was occurring in both medical and consumer publications, medical journals were advising doctors to initiate discussions regarding HT with middle-aged women in order to allow a greater number of women to benefit from "the high therapeutic value of HT" (757).

2.1.4 The Influence of the WHI Study

At the same time as the "portfolio of presumed benefits" (Herrington and Howard 2003, 519) from postmenopausal HT grew, there was increasing societal awareness of the paucity of research into health problems and medical treatments unique to women (Finnegan 1996). The Office of Research on Women's Health was established in the United States in 1990 to rectify this situation. This set the stage for the WHI study, which addressed the prevention of disease in the postmenopausal life stage and which focused on clinical outcomes rather than intermediate physiologic or morphologic outcomes (Rossouw et al. 1995).

Although scheduled for final release of results in 2005 (National Women's Health Network 2002), the estrogen plus progestin trial within the WHI study was abruptly halted in July 2002 when results indicated that the HT regime under study increased the risks of both coronary heart disease and invasive breast cancer (Fletcher and Colditz 2002; Rossouw et al. 2002). Over the next year other results were published that linked HT to an increased risk of stroke (Wassertheil-Smoller et al. 2003), "a small increased risk of clinically meaningful cognitive decline" (Rapp et al. 2003, 2663), increased "risk for probable dementia in postmenopausal women aged 65 years or older" (Shumaker et al. 2003, 2651), and a possible increase in the risk for ovarian cancer (Anderson et al. 2003). Recently published studies also demonstrated that HT does not protect against arteriosclerosis (Hodis et al. 2003) or coronary heart disease (Manson et al. 2003), and that the HT treatment regime used in the WHI study had "no significant effects on general health, vitality, mental health, depressive symptoms, or sexual satisfaction" (Hays et al. 2003, 1839). Although the WHI study demonstrated that HT reduced the risk of fracture in healthy postmenopausal women, this portion of the study concluded "when considering the effects of hormone therapy on other important disease outcomes in a global model, there was no net benefit, even in women considered to be at high risk of fracture" (Cauley et al. 2003, 1729). While observational studies and studies of the biological mechanisms underlying disease had appeared to support the use of HT for the long-term prevention of chronic disease, the WHI results "elegantly demonstrate that the scientific validity of ideas that appear to be intuitively correct must be proven through well-designed studies" (Day 2002, 361).

2.1.5 Response to the WHI Study

While pharmaceutical companies continue to promote HT in journals arriving free at doctors' offices (Bessette 2003), new information about HT has been appearing regularly in the lay press since July 2002 and has left the majority of women feeling confused (Breslau et al. 2003) and even "betrayed" (Love 2003, 5). A national telephone survey carried out in the United States in the first month following the initial publication of WHI findings found that "64% of the women interviewed had heard something about [the WHI] study from the media or from talking to others," 57% were worried about how they would be affected by the findings, and 13% had already stopped taking HT (Breslau et al. 2003, 33). Awareness of the WHI study was related to increased socioeconomic status, and previous or current use of HT. Six months following the initial release of WHI results, 58% of respondents to a survey conducted in New Zealand had stopped taking HT; 18% restarted HT because of the return of symptoms or having a hysterectomy (Lawton et al. 2003).

Although data about change in HT usage following publication of the initial WHI results is limited thus far, widely varying reactions to the WHI study are evident in the medical literature. While one article reported that WHI results cannot be applied to all populations of postmenopausal women, and that evidence and risk has been misrepresented in media (Reid 2003), another noted that the study was designed ten years ago and recommended that health providers "resist the knee-jerk call to stop medication . . . [and] assess how much benefit [HT] is adding and will add to each individual woman's quality of life" (Strickler 2003, 490). Some authors have used the startling findings of the WHI as an opportunity to note lessons that the medical profession might learn from this unexpected research: Simon and Mack (2003) noted that physicians should be prepared to discuss alternative therapies with women; Yusuf and Anand (2002) pointed out the importance of "well-designed, large randomized trials as the only reliable method to evaluate most common interventions" (359); Sackett (2002) warned the medical profession that injudicious application of preventative medicine may result in a presumption of positive outcome in the absence of evidence, and in an overbearing or even aggressive attitude towards those who question the value of preventative recommendations; and Day (2002) pointed out that since most clinical trials are currently carried out by the pharmaceutical industry and are motivated by a desire to license new therapies, research support from the public sector is critical.

The WHI has had a clear impact on information published by regulatory bodies involved with women's health issues. Both the Society of Obstetricians and Gynaecologists of Canada and the American College of Obstetricians and Gynecologists have produced documents that specifically address the clinical application of WHI findings (Society of Obstetricians and Gynaecologists of Canada n.d.; American College of Obstetricians and Gynecologists 2002). The FDA has also made available a fact sheet which directly interprets this study for readers (Food and Drug Administration 2003).While potential for future manipulation of HT remains open (Herrington and Howard 2003), it is clear that the WHI has had a decisive impact and the "whole idea that we need to 'replace' hormones long term" has been and is being re-examined (Love 2003, 3).

2.2 DIFFUSION OF INNOVATIONS THEORY

Roger's Diffusion of Innovations theory was the underlying framework used in this study to examine the role of literature in the diffusion of ideas and decision-making process related to the use of HT. *Diffusion* is the process by which an innovation is communicated through a variety of channels over time and among members of a given social system (Rogers 1995). This dissemination focuses on the spread of messages that are related to new ideas or technologies and on a behavioral reaction, either adoption or rejection, as a consequence of new messages. Because Diffusion of Innovations theory is not oriented towards the content of a new idea, this theory provides a framework for analyzing any type of innovation and the process by which it is diffused. Understanding this process, a process first formalized into theory by Rogers in 1962 and now elucidated by over 6200 diffusion studies (Rogers 2002), and the role of the literature in this process, requires an appreciation of the following: (1) the different phases within the I-D process; (2) the specific innovation attributes and how these attributes are articulated through various communication channels; (3) the communication channels themselves; and (4) the characteristics of the social environment within which the innovation is being diffused. For the purposes of this study, the role of the published literature within the context of diffusions research was also evaluated.

2.2.1 The Innovation-Decision Process

The I-D process incorporates information seeking and information processing as the individual or organization decreases uncertainty about an innovation and moves through the following stages: (1) knowledge acquisition, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. While there is evidence for sequential movement through these stages (Rogers 1995), McKinlay (1981) notes that many medical innovations are adopted prior to full knowledge acquisition, thus resulting in a premature adoption decision and subsequent innovation rejection. Communication plays an important role in the I-D process, as different communication channels may be involved at different stages in the process (Coleman, Katz, and Menzel 1966). Furthermore, the dissemination strategies and communication channels chosen by researchers or by industries with commercial interest in the innovation will play a critical role in the extent to which an individual or organization becomes knowledgeable about an innovation; this will ultimately influence adoption (Dobbins et al. 2002; Ferrence 1996).

2.2.1.1 Knowledge Acquisition

At the knowledge acquisition (KA) stage in the I-D process, an individual becomes aware that an innovation exists (*awareness-knowledge*), learns what is required to use the innovation (*how-to-knowledge*) and sometimes also gathers information related to the underlying principles about how the innovation works (*principle-knowledge*). While there is debate about whether the need of an innovation precedes awareness that an innovation exists, Coleman (1966), in a study exploring the diffusion of a new antibiotic drug treatment, concluded that initial knowledge of the new medical treatment was not actively sought by physicians; however, later in the I-D process the doctors did actively seek information. Although some authors have argued that the need for HT occurred long before innovation development or widespread adoption of HT (Reuben 1969; Wilson 1966), both the history of human hormone research (Oudshoorn 1990) and the aggressive advertising of HT to both prescribing physicians and potential users (Kaufert and Lock 1997; Palmlund 1997a) suggests that the awareness of HT as a long-term preventative therapy for menopausal and postmenopausal women was closely associated with the perception of need. For health professionals, initial knowledge of an innovation is frequently communicated through journal articles, the posting of new policies or procedures from an authoritative source, and through conference presentations (Fendrick, Hirth, and Chernew 1996; Landrum 1998a).

2.2.1.2 Persuasion

While awareness-knowledge may also occur during the persuasion stage, it is at this phase in the I-D process that a general perception of the innovation is determined, that potential adopters begin to think hypothetically about the innovation in a type of vicarious trial, and that a favorable or unfavorable attitude towards the innovation is formed. Perception of innovation attributes assumes importance during the persuasion stage and innovation-evaluation information is frequently sought in order to reduce uncertainty about the expected consequences of adoption. In the health sciences, this type of information is often available in the scientific literature, although Rogers (1995) suggests "most people depend mainly upon the subjective evaluation of an innovation that is conveyed to them from other individuals like themselves who have previously adopted the innovation"(18). At the persuasion stage, the major mental activity moves from cognition to feeling as potential innovation adopters begin to believe that they want or need to utilize a given innovation (Rogers 1995).

At the persuasion stage in the diffusion of a medical innovation, formal medical education may give "an early and influential boost" in the persuasion process (McKinlay 1981, 383). Landrum (1998b), in her exploration of marketing innovations to nurses, suggests that by combining Rogers' diffusion theory and marketing principles, persuasion will be facilitated and clinical innovation will be more readily adopted. Concern has been expressed about the role of industry in persuading doctors and patients to adopt various medical innovations through the provision of selected published materials, sponsorship of educational events, and advertising (Angell 2000; Mintzes 2002; Moynihan 2003b). Since it is now well recognized that HT as a long-term preventative therapy was widely adopted despite the absence of large-scale, long-term RCTs, this concern is particularly germane to discussions about the adoption of HT by prescribing physicians.

2.2.1.3 Decision

When enough information has been gathered to form an opinion, then the decision to adopt or reject the innovation is made. While the quest for information may continue, adoption represents the decision that the innovation is currently the best option available (Rogers 1995). Research demonstrates that a positive adoption decision may be facilitated by an opportunity to try the innovation on a partial basis; individuals who try an innovation tend to adopt it as long as it demonstrates "at least a certain degree of relative advantage" (Rogers 1995, 171). *Change agents*, individuals who seek to influence the I-D process in the direction desired by an organizational or commercial *change agency*, commonly offer clients free samples in order to encourage a positive adoption decision (Rogers 1995). The distribution of free, sample medicines to physicians is a well-established, integral part of pharmaceutical marketing, and is associated with "awareness, preference and rapid prescription of a new drug" (Wazana 2000, 376). For some individuals, a peer account of innovation use will act as a vicarious innovation trial and will facilitate an adoption decision. Rejection of an innovation may occur following serious adoption consideration or may occur passively when individuals do not give serious consideration to a given innovation.

2.2.1.4 Implementation

Implementation occurs when there is behaviour change and the innovation is put into use. Although uncertainty about the consequences of innovation use may remain, at this stage the I-D process ceases to be a mental exercise and the innovation is integrated into real life. During implementation, post-adoption questions about how the innovation is used, how it works in practice, and operational problems that may be encountered and how they might be solved are dealt with. An innovation may be adapted for specific circumstances and the implementation process may continue for varying periods of time before the innovation becomes institutionalized (Rogers 1995). Although the adoption of pharmaceutical interventions traditionally has been viewed as a physician controlled process, recent attention to the reluctance of patients to fill and maintain HT prescriptions has resulted in the promotion of a flexible approach to patient/physician relationships (Pitkin 2002) and new modes of HT delivery as means of increasing implementation (Christiansen 2001; Genazzani and Bernardi 2002; Kenemans et al. 2001; Session and Jewelwicz 1993). During this stage in the I-D process the innovation may go through *re-invention* as it is changed or modified to facilitate adoption (Rogers 1995).

2.2.1.5 Confirmation

People frequently seek information following innovation adoption in order to confirm their adoption decision. At this stage in the process remaining *dissonance* is addressed (Rogers 1995). While some may avoid dissonance by seeking information that supports their decision, innovation discontinuance in the health sciences occurs with regularity as new ideas or innovations replace the original (the adoption of tetracycline, for example, superseded previous antibiotic treatments (Coleman, Katz, and Menzel 1966)), or concerns related to the original innovation emerge.

Despite the widespread endorsement of HT as a long-term preventative therapy prior to July 2002, the WHI's unexpected findings made the confirmation stage of this innovation particularly eventful. In the face of dissonance produced by the early publication of WHI results, some articles sought to provide information that would confirm a previously made adoption decision by suggesting that the original therapy, while perhaps requiring some variant application, was not entirely inappropriate (Reid 2002; Reid 2003; Strickler 2003); other articles promoted discontinuance of HT as a long-term preventative therapy (Day 2002; Herrington and Howard 2003; Yusuf and Anand 2002). These two approaches reflect the two potential outcomes of dissonance as described by Rogers (1995): the innovation is superseded or modified by another idea or another approach; or the innovation is rejected outright. Because HT represents, to some degree, an abstract concept, it is possible that new applications for exogenous hormones will emerge in the future and the literature will again reflect an I-D process related to the therapeutic use of human hormones.

2.2.2 Innovation Attributes

The adoption of an innovation is significantly influenced by the innovation's attributes, in particular, by the following characteristics: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability.

These attributes provide a structure for examining innovation properties and, by defining the meaning of these attributes for the individual innovation, the characteristics influencing behaviour change can be identified and the "nuances of contrasting innovations" (Meyer, Johnson, and Ethington 1997, 126) can be explored.

Relative advantage is "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers 1995, 212). While the type of relative advantage is determined by the nature of the innovation, advantage is commonly expressed in terms of economic profitability, social prestige, or, in clinical medical practice, in terms of improved patient outcome. An article discussing the hypothesized estrogen-dementia link and highlighting the economic costs of caring for those with Alzheimer's disease (Beckmann 1997), for example, presented to potential adopters the idea that prescribing HT had an economic relative advantage over non-prescription. On the other hand, an article endorsing HT as a means to prevent the "serious clinical complications" of menopause (Genazzani and Gambacciani 2001, S49) presented relative advantage in terms of improved patient well-being. Researchers studying the diffusion of preventative medicine and health promotion programs note that diffusing these types of innovations is more difficult because the relative advantage may not be immediately apparent: the consequences of previous, unhealthy behaviours may not go away immediately, and the rewards for innovation adoption may be intangible or delayed (Gantz, Fitzmaurice, and Yoo 1990; Rogers 2002). By manipulating, either consciously or unconsciously, the presentation of an innovation's perceived relative advantage, adoption rates can be improved.

An innovation will be *compatible*, and thus more quickly adopted, if it is consistent with socioeconomic values and beliefs, if it is consistent with past experience or previously accepted ideas, or if it fits the needs of the potential adopter. Rogers highlights this by pointing out that compatibility of an innovation with preceding ideas will either speed up or slow down innovation adoption since "old ideas are the main mental tools that individuals utilize to assess new ideas" (Rogers 1995, 225). Literature discussing the decision-making process of women considering HT clearly demonstrated that compatibility with beliefs, values, and the broader context of life experience impacts HT adoption (Hunter, O'Dea, and Britten 1997; Marmoreo et al. 1998; Walter and Britten 2002). With the increasing expression of the medicalized view of menopause (Topo 1997), however, the view of menopause as a deficiency disease has dominated medical and consumer literature, thus creating an environment in which the results of the 1998 Heart Estrogen/progestin Replacement Study (Hulley et al. 1998) were essentially ignored because they were not compatible with widespread belief that HT was cardioprotective. While health care professionals may share the basic value of promoting high quality patient care, innovation adoption in medical fields is challenged by the ongoing need to reconcile previously held ideas with new information.

Complexity, "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers 1995, 242), is a critical innovation attribute. It is important to note that the type and quality of communication has a significant impact on the health care provider's perception of innovation complexity. Research demonstrates that when how-to knowledge is unclear or when the language used to communicate innovation is too complex for the target audience, it is more likely that the innovation will be rejected (Dooks 2001; Joyce, Keck, and Gerkensmeyer 1999). In the same way that some articles highlight the relative advantage of HT, others focus on explaining varying modes of delivery, thus contributing to the diffusion of this innovation by reducing complexity for prescribing physicians (Christiansen 2001; Kenemans et al. 2001). Topo (1997), in his content analysis of menopause literature, found that some medical authors justified withholding information about HT from patients in order to reduce complexity and encourage HT adoption.

If an innovation can be used on a limited, trial basis prior to full commitment to adoption, there is a higher likelihood that the innovation will be adopted. This attribute, *trialability*, is especially important to early innovation adopters as their experiences end up acting as vicarious trials for later adopters (Rogers 1995). In the health sciences, published literature provides a structure for communicating and evaluating the trialability of an innovation. Since HT is frequently started and then dropped if side effects become unacceptable to the patient (Hunter, O'Dea, and Britten 1997), the trialability of this innovation increases the likelihood that physicians will prescribe the therapy and women will consider commencing HT.

Diffusion studies indicate that the *observability* of an innovation, as perceived by a potential adopter, is positively related to the rate of innovation adoption (Rogers 1995). Since innovations aimed at disease prevention are more difficult to observe, they have been found to diffuse more slowly (Rogers 2002). Prolific advertising in medical and consumer publications, as well as at conferences and workshops highlighted the supposed observable results of long-term preventative HT:

> Unlike the women shown in the pharmaceutical advertisements in the 1970s, this 1990s version of the menopausal women does not look at all depressed, but is shown exercising, playing with grandchildren, lunching with friends, talking to a daughter, looking through a microscope. Usually smiling, glowing with fitness, with well-maintained teeth, hair and skin, these pictures sometimes also suggest a discrete but well-enjoyed sexuality. Everyone looked far too fit to break a hip, have a heart attack or witness the slow destruction of their minds by Alzheimer's disease. (Kaufert and Lock 1997, 84)

Between 49 and 87 % of the variance in innovation adoption rates can be explained by the five primary innovation attributes (Rogers 1995); thus, the way in which these attributes are portrayed in the literature is critical to the adoption of an innovation.

2.2.3 Communication Channels and Networks

"Every diffusion process is fundamentally based on the spread of information concerning the innovation among the members of a social system" (Kortelainen 1997; 556). The way that information is communicated, therefore, assumes critical importance for the diffusion of an innovation and the more credible and respected the source, the greater is the likelihood of adoption (Ferrence 1996). While *communication channels* represent different sources of information, a *communication network* "consists of interconnected individuals who are linked by patterned flows of information" (Rogers 1995, 308).

Communication channels are broadly categorized by Rogers (1995) as either mass media or interpersonal and as originating from either cosmopolite or local sources. Mass media channels reach a large audience rapidly, spread information quickly, and lead to changes in weakly held attitudes; interpersonal channels are more likely to influence or change strongly held attitudes, allow individuals to receive all the desired information about an innovation, and play a significant role in persuading an individual to adopt an innovation. Cosmopolite channels, those originating outside the social system, are particularly important during the knowledge stage of the I-D process, whereas local communication channels are relatively more important during the persuasion stage. Many diffusion studies support Rogers' contention that cosmopolite channels play a more important innovation-information role for early adopters whereas interpersonal and local channels tend to be the most important channels for later innovation adopters (Coleman, Katz, and Menzel 1966; Dooks 2001; Landrum 1998a).

Communication networks have a degree of structure and stability and, as a result, allow some level of predictability related to information flow. For example, "radial personal networks," sets of individuals linked to a focal individual but not interacting with one another, allow the diffusion of innovations within a wider environment than closely cohesive interpersonal networks (Rogers 1995, 308). The social structure of communities will influence communication networks and thus influence the rate of innovation adoption. Since there are varying social structures and communication networks within scientific communities, innovation adoption rates will vary even within different health science disciplines (Hahn and Schoch 1997).

The diffusion of an innovation is integrally tied to the communication channels and networks that carry information to potential adopters. While it is recognized that different channels are of varying importance during different stages of the I-D process, communication is a dynamic process that occurs within a specific cultural and technological context and, therefore, it demands careful consideration on an ongoing basis. Classic diffusion studies, in fact, recognize the complexities of communication and suggest that future diffusion researchers explore questions related to the role of different communication sources and channels (Valente and Rogers 1995).

2.2.4 Diffusion Research in Medical Fields

Rogers' Diffusion of Innovations theory has been used to gain a better understanding of the forces that influence the transmission of innovations into clinical medical practice and into the public arena where patients are the potential innovation adopters. In 1967, 36 diffusion studies, which represented 7% of all diffusion publications, were classified as being in the area of health and medical sociology. Over the following years the number of publications in this area of diffusion research increased in direct proportion to all diffusion publications and, in 1994, there were 277 medically related diffusion publications (Rogers 1995). The majority of innovations that have been studied relate to new drugs or other medical ideas where health professionals are the potential innovation adopters, and to health promotion or preventative innovations where patients are the potential adopters.

2.2.5 The Role of Published Literature

Diffusion research suggests that most individuals rely on the subjective evaluation of innovations as communicated to them by interpersonal communication channels and not on scientific studies: "diffusion investigations show that most individuals do not evaluate an innovation on the basis of scientific studies of its consequences, although such objective evaluation are not entirely irrelevant" (Rogers 1995, 18). In medical fields, however, utilization of information published in medical journals is a critical concern as the diffusion of research based knowledge into clinical practice is an expected part of maintaining standards of practice (Dobbins et al. 2002). In addition, patients and readers of medical lay literature assume that views propagated by medical authorities are based on trustworthy research (Griffiths 1999; Lyons and Griffin 2003). It is, therefore, valuable to consider the role of medical and consumer literature, as communication channels and as part of a communication network when studying innovation diffusion within medical fields, and diffusion from medical to public spheres.

In my exploration of medical diffusion research, I was surprised to find relatively little comment on the role of scientific literature. While evidence based medicine, which focuses on the promotion of research-based medical literature as a basis for clinical decision-making, is receiving an extraordinary amount of attention both in the medical literature and in medical education (Gonzales, Ringeisen, and Chambers 2002), health science diffusion research pays scant attention to the role of published information. Where scientific literature is discussed, comments are generally brief and published information is allocated to an insignificant role in the diffusion process (Dooks 2001; Rogers 1995). Interpersonal relationships between physicians (Borbas et al. 2000; Coleman, Katz, and Menzel 1966) and between physicians and their patients (Brown et al. 2002; Hunter, O'Dea, and Britten 1997), on the other hand, are frequently presented as primary factors in the adoption of a clinical innovation. The importance of interpersonal relationships is further confirmed by studies demonstrating that when medical innovations are introduced through opinion leaders, the diffusion process is speeded up (Farquahar et al. 1990; Lomas et al. 1991; Puska et al. 1986).

Although the central role of interpersonal relationships in the diffusion of innovations is not being debated, an exploration of diffusion research makes apparent the lack of interest in the role of published literature within this research tradition. The recent shift "from considering innovation attributes and adopter characteristics to considering communication channels and the diffusion context" (Oldenburg, Hardcastle, and Kok 1997, 275), however, makes timely the research questions which were explored in this thesis study.

2.3 STRENGTH OF WEAK TIES THEORY

Strength of Weak Ties (SWT) theory provides a framework for exploring the impact of different types of ties that carry information and ideas, within and between social networks. Granovetter (1973) contends that *weak ties* (WTs) are valuable because it is through relationships with loosely connected individuals that new information can flow from outside sources into personal networks where people have *strong ties* (STs), that is, they know and interact extensively with one another and consequently tend to have access to the same information. Granovetter described his theory as "exploratory" (Granovetter 1973, 1378) and, since it was first proposed, SWT theory has been used as a framework for examining information transmission. To gain an appreciation for the potential role of WTs it is helpful to compare and contrast weak and strong ties, to evaluate how this theory has been operationalized in different research studies and to consider how published literature may act as a bridging WT.

2.3.1 The Role of Weak vs. Strong Ties

A *tie* simply refers to a positive and reciprocal relationship between a focal individual and another network member. Granovetter suggests that the strength of a tie is an intuitive concept consisting of a "combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services" between individuals (Granovetter 1973, 1361). The stronger the tie, the more similar individuals can be assumed to be and the greater the likelihood that they will share mutual STs to others within their social network. Individuals with WTs, on the other hand, are "less likely to be socially involved with one another" and will likely be involved in different social networks with few or no mutual acquaintances (Granovetter 1982, 106). In this context, the WT represents a critical relationship that can potentially carry novel information between two otherwise isolated groups of people. Weenig (1993), in an exploration of information diffusion through a community-based program, found that awareness of information communicated by sources external to the community was related to the number of WTs, whereas the diffusion of information sent out by internal sources was related to the number of STs. It has been suggested that the strength of WTs lies primarily in the fact that individuals are likely to have a high number of these more superficial ties and thus their capacity to carry information "lies not in individual efficiency but in their numbers" (Friedkin 1982, 285). This perspective is refuted by research demonstrating the unique capacity of WTs as information *bridges* that can carry non-redundant information between loosely connected social networks (Granovetter 1982; Levin, Cross, and Abrams 2002; Weenig 1993; Weimann 1983). While not all WTs are bridges, "only *bridging* weak ties are of special value to individuals" (Granovetter 1982, 112).

It is important to recognize that there is, in fact, an intricate interplay between weak and strong ties. Granovetter's theory, while focusing on the counterintuitive argument that WTs are critical for an individual's societal integration and are the means by which important information is transmitted between loosely associated social networks, does not dismiss strong interpersonal relationships as insignificant for information flow. From a macroscopic perspective, social systems lacking in WTs will be fragmented into cliques, new ideas will spread slowly, and scientific advances will be hindered; however, it is through STs that influence is more likely to flow (Weimann 1983) and that innovation adoption is more likely to be stimulated (Weenig 1993). While WTs, through their bridging capacity, provide greater access to non-redundant ideas, STs act as validators: "they offer their opinions on the value, relevance, and usefulness of new information that the focal person receives from weak ties" (Baker and Pettigrew 1999, 447). Individuals thus tend to act on the basis of awareness-knowledge received from WTs and trusted input received from STs who "have greater motivation to be of assistance and are typically more easily available" (Granovetter 1982, 113).

Levin, Cross and Abrams (2002) in their study, which explored the benefits of weak versus strong ties, found that while "strong ties did have a positive and statistically significant (p<.001) overall effect on the receipt of useful knowledge," (19) the impact was positive because of the typical association of STs with benevolence and competence based trust. When trust dimensions were controlled for, however, the benefits of WTs became apparent. At the same time as the risk for misplaced trust was acknowledged, these researchers suggested, "individuals and organizations could benefit from developing trusted weak ties" (25).

2.3.2 Strength of Weak Ties Operationalized

Although this theory has not been widely used outside the social sciences, the association between tie strength and the communication of new information provides a set of propositions that can be applied to inquiry beyond the social sciences and the strict application to social networks. The ability to operationalize tie strength in a specific research study allows this theory to be used in an interdisciplinary context to generate explanations for observed relationships. Schwartz (1994), for example, proposed that "academic librarians, by facilitating knowledgeable Internet activity . . . can provide the strength of weak ties on which system wide adoption and integration of the new technology rests" (536). This proposition uniquely operationalizes WTs since it defines tie strength on the basis of the information-providers' role or function as opposed to the interrelationship between two individuals.

Granovetter's (1973) theory is specifically related to information flow through interpersonal ties and does not discuss communication channels such as the published literature. It is conceivable, however, that within the broader context of information diffusion, this theory may be used to explore the impact of varying ties through which information flows; for example, the role of published information as a bridging WT between loosely connected, medical groups or the role of consumer publications in bridging the gap between medical and consumer communities, thus influencing the knowledge and attitudes of women towards a given therapy.

2.3.3 Published Literature as a Weak Tie

The role of published literature in the change process and in the diffusion of innovations is ambiguous. While Rogers (1995), Granovetter (1973), and other diffusion scholars have dismissed the scientific literature as being an insignificant force in changing people's behaviour, the vital role of published medical research is recognized: "learning to evaluate and use research findings in daily practice is an important and lifelong part of professional development" (Haines and Donald 1998, 74). At the same time it is recognized that actual behaviour change most frequently occurs as a result of interpersonal interactions (Borbas et al. 2000; Coleman, Katz, and Menzel 1966). In order to resolve this ambiguity, it has been proposed that just as weak interpersonal relationships may provide the bridge over which new information flows between loosely connected individuals (Granovetter 1982), published literature provides a conduit through which new information may also flow between loosely connected individuals and groups (Genuis 2003).

By viewing literature as a WT in the multifactor communication network involved in diffusion, a more comprehensive understanding of the role of published literature in this process can be achieved. Closely related groups in medicine may be defined by geographical location, shared specialty status, or shared involvement in a medical subspecialty. While such a group generally has access to the same information base and utilizes similar, accepted treatment approaches, evidence based practice presupposes that high quality health care must be consistent with the best evidence available throughout the medical world (Guyatt et al. 2000); thus, medical fields require numerous bridging ties which can, on an ongoing basis, transport novel information between loosely connected groups. Published medical literature, particularly as facilitated by online, public resources such as PubMed or government information websites, has the unique functional capacity of a WT: it can act as a bridge over which innovative ideas flow from one cohesive social or professional group to another and into the consumer population. To further this view of the literature as a WT, it can be pointed out that just as WT relationships bring novel information into a clique where the information is then diffused through ST relationships (Weenig 1993), it has been found in medical diffusion studies that early adopters who become instrumental in diffusing an innovation within their circle are more likely to read the medical literature and be oriented towards information sources coming from outside their immediate social system (Coleman, Katz, and Menzel 1966; Rogers 1995). The published literature may thus assume a critical WT role as it provides a means by which information travels between loosely connected medical groups and the public.

2.4 THE MEANING OF MENOPAUSE

In order to explore the role of medical and consumer articles in the diffusion of information related to HT, it is important to have an appreciation for the meaning and context of menopause. Although menopause is clearly a biological occurrence, cultural environments shape interpretation of this life event. The medical literature is dominated by the biomedical model that interprets menopause as a deficiency state, which is accompanied by short-term symptoms, long-term disease risk, and a need for medical intervention. A contrasting perspective is presented by those who view menopause as a normal life transition, a process that "touches on many aspects of women's lives, from women's physiology and intrapsychic experiences to social structures and norms" (Gonyea 1996, 418). These divergent views of menopause shape not only women's and physicians' perceptions of this life experience (Hemminki and Topo 1997; Stephens, Budge, and Carryer 2002), but also how researchers approach questions related to menopause (MacPherson 1990) and how management of this life stage is presented in medical and consumer literature (Worcester and Whatley 1992). It is, therefore, useful to give a basic overview of the presuppositions of the biomedical model, the medicalization of menopause, and the 'normal life transition' (Gonyea 1996) model.

2.4.1 The Biomedical Model

Western medicine has been viewed traditionally as an objective science, which evolved based on progressively more accurate knowledge of diseases and treatment. This view is based on the *biomedical model*, which assumes the following: (1) *mind-body dualism*, that is, the mind and body can be treated separately; (2) the body can be repaired, thus a *mechanical metaphor* can be used to describe the action of doctors; (3) intervention should follow the identification of dysfunction, thus presenting a *technological* or *treatment imperative* to both patients and doctors; (4) explanation of disease focuses on biological changes and factors, which results in a *reductionist* perspective; and (5) reductionist tendencies are intensified by the *doctrine of specific etiology*, the assumption that every disease is caused by a specific, identifiable 'disease entity' (Nettleton 1995). While the biomedical model is firmly entrenched in traditional medical fields, the central concerns of the sociology of health and illness have "emerged as reactions to, and critiques of, this paradigm" (Nettleton 1995, 2).

The biomedical model may be challenged on a number of fronts: (1) the effectiveness of the biomedical model has been challenged as the iatrogenic effects of interventions (adverse conditions in patients arising from treatments by physicians) are increasingly realized (Nettleton 1995; Starfield 2000); (2) the failure to view individuals within their socio-environmental context has led to an underestimation of the links between material circumstances, environment, and illness (Pope and Rall 1995; White 2002); (3) patients are viewed as passive recipients of medical care and, because of the assumption that the scientific method "identifies the truth about disease" (Nettleton 1995, 7), values may be transformed into apparent facts as normal life events are constructed as problems requiring medical intervention and supervision (Moynihan, Heath, and Henry 2002); and (4) the boundaries of medical practice are not defined by objective demarcations of knowledge, rather, they are the outcome of struggle and negotiation with other para-medical and professional groups (White 2002; Nettleton 1995). Sociologists have thus effectively argued "medical knowledge is not disinterested, objective scientific knowledge, but is both shaped by and shapes the social structures within which it is embedded" (White 2002, 2).

While the sociology of health and illness has become a recognized sub-branch within sociology, the application of social constructionism to the field of medicine has been criticized for its apparent neglect of biological 'realities.' Friedson (1970), however, points out that although concepts of illness may be thought of as based on biological science related to specific viruses and molecules, diagnosis and treatment are social acts. Therefore, medicine may claim to be a biologically-based science, but the application of medical knowledge is mediated by political and societal circumstances and is thus inherently based on the "interpretive character of social reality" (Freidson 1970, 208).

2.4.2 The Medicalization of Menopause

During the twentieth century, the institution of medicine gradually rose in dominance so that today it has become "the scientific arbiter of normality" (White 2002, 47). Claiming expertise in areas of life not previously considered within medical parameters, medicine now "constructs, or redefines, aspects of normal life as medical problems" (Nettleton 1995, 27). This *medicalization* of life's processes can be clearly seen in the illustrative case study chosen for this exploratory study: women in the menopausal and postmenopausal years were defined as being ill and menopause was identified as a 'deficiency disease'; this life stage was constructed as a time of significant risk to women's health and well-being (Palmlund 1997b); and a treatment imperative emerged (Topo, Hemminki, and Uutela 1993, 107). With the widespread promotion of HT to both physicians and women (Palmlund 1997a; Kaufert and Lock 1997) , the language used in texts to describe and understand this phase of life "shifted markedly to the biomedical" (Hunter 1996, 119) and became the paradigm that "predominates in research literature and media accounts" (Hunter, O'Dea, and Britten 1997, 1541).

The adverse consequence of medicalizing menopause impacts not only the health and well-being of individual women, it also affects the way doctors approach midlife and older women patients. Meyer (2001) outlines six major consequences of medicalizing this life stage: (1) medicalization leads to different and unequal approaches to disease prevention between men and women; (2) while most drug therapies require large, high quality studies substantiating efficacy and safety prior to widespread distribution, the medicalization of menopause has allowed a lower standard of proof for HT as a preventative therapy of women; (3) women are encouraged to and sometimes frightened into (Winterich and Umberson 1999) accepting the adverse consequences of hormones because of the belief that it will decrease the risk of disease over the long-term; (4) it commonly leads to further medicalization of women's lives as they become dependent on the medical system to manage complications of HT and the chronic use of medication; (5) medicalization of this life stage diverts attention from real health-related factors, such as physical activity (Cousins and Edwards 2002), that affect women's health; and (6) women are psychologically and socially harmed by the medicalization of menopause as it reinforces inequality between the sexes. Meyer (2001) concludes: "There is no convincing evidence that the lowered levels of reproductive (or growth) hormones are insufficient to maintain health well into old age. But we do have convincing evidence that the medicalization of menopause harms women, and this issue therefore needs to be addressed" (782).

The perception that physicians were finally empowering women to take control of their futures through the use of preventative HT had the ironic effect of making women more dependent on the medical establishment (Worcester and Whatley 1992). Winterich and Umberson (1999), in their exploration of the social contexts affecting women's construction of the menopausal experience, found that "the medical context most significantly affects women's menopausal experiences" (Winterich and Umberson 1999, 71). Another study found that because of pervasive advertising and 'health education,' women were likely to visit their physicians with concerns about menopause, regardless of whether they are experiencing symptoms or not (Leidy, Canali, and Callahan 2000). Furthermore, routine preventative treatment lends credence to the notion that women's bodies have innate flaws (Meyer 2001, 782) – a notion Wilson (1966) legitimized in his influential book: "the normal, natural, harmonious aging rate with respect to lifespan is found in the example of the healthy man. A man remains a male as long as he lives . . . how different is the fate of woman" (50-51).

The promotion of a medicalized view of menopause in consumer publications has had a profound impact on women's views of midlife. Women, who frequently rely on media and women's magazines as major sources of information about HT and menopause (Clinkingbeard et al. 1999; Griffiths 1999), have been exposed to indirect and subtle marketing which "convey[s] the message . . . that taking estrogen drugs is a necessity to compensate for the fall in [women's] endogenous estrogen production" (Palmlund 1997a, 162). In addition, it has been noted that advertisers have profound influence over the editorial content of women's magazines and that these venues communicate strong messages about the way women should understand the postmenopausal stage of life (Steinem 1994). In the mid-1970s, for example, texts and images presented middle-aged women as melancholic and ill, thus seeking to scare or shame women into taking HT; in the 1980s and 1990s, however, women were depicted as vibrant and sexy, thus appealing to a desire for vitality, youth and beauty, and suggesting that these ideals could be achieved through HT (Palmlund 1997a).

Despite the predominance of the medicalized view of menopause in the literature, decisions about the use of medications, including HT, are linked to patient's beliefs related to the biomedical approach to health (Britten 1994). A qualitative study examining women's decision about HT use suggested that although women in the 1990s were likely to take HT on a short-term basis for vasomotor symptoms (primarily hot flushes), many women viewed HT as "an inappropriate treatment for menopause which they regarded as a natural process, unless undue symptoms occurred" (Hunter, O'Dea, and Britten 1997, 1547). The medical literature notes that a lack of patient compliance to HT is a barrier to appropriate menopause management (Kaplan et al. 2002; Pitkin 2002; Thompson 1995). Hunter, O'Dea and Britten (1997) however, observe that the main reason given by women for HT use is hot flushes; therefore, compliance rates may well be appropriate as they approximate the number of women actually suffering from this symptom.

There has been dissent in the medical and consumer literature about long-term HT use, the medicalization of this life stage, and the lack of information about menopause as a normal life transition (Coney 1994; Topo 1997). While the publication of WHI findings in 2002 validated those who have disputed the medicalized approach to menopause, clinicians and consumers have been left with the task of untangling conflicting information about the safety and efficacy of HT (Breslau et al. 2003) and re-evaluating the basic presuppositions of medicalization (Love 2003).

2.4.3 The Normal Life Transition Model

Although the biomedical definition of menopause has dominated the medical and consumer literature (Hunter, O'Dea, and Britten 1997, 1541), there is evidence for a view of menopause as a normal life transition, which is "mediated through cultural understandings and socioeconomic conditions" (Gonyea 1996, 418). Flint and Samil (1990), in their cross cultural study, point out to medical readers that each woman's culture influences the way she responds both subconsciously and consciously to menopause. They suggest that an interdisciplinary "biopsychocultural" approach, which acknowledges menopause as a natural, biological life phase that is experienced differently in various cultures and settings, will allow the individual doctor to be "a better physician to his/her patient" (Flint and Samil 1990, 145). Love (2003), in her *New York Times* bestseller, *Dr. Susan Love's Menopause & Hormone Book*, describes menopause as a "biocultural" (31) event and explains to consumers that individual and cross-cultural differences as well as social factors influence how a woman experiences this life transition. While Mayan and Japanese women have no word for 'hot flash,' studies of Rajput women in Northern India and of village women in northeast Thailand reveal that these women reported no symptoms and welcomed menopause as a time of freedom from menstruation, pregnancy and childbirth (Love 2003).

While the medicalized view of menopause has been commonly justified by the claim that women are living much longer, outliving their ovaries, and thus require HT to restore the natural hormonal balance of the female body (Genazzani and Gambacciani 2001; Nachtigall 1990; Wilson 1966), others point out that the postmenopausal woman continues to produce estrogens at a level sufficient for the needs of an older woman's body (National Women's Health Network 2002; Worcester and Whatley 1992). Furthermore, the life expectancy of women and men has increased dramatically in the last 150 years, but this increase relates to life expectancy at birth. Life expectancy at 65 years of age has only increased by four years for women; it is reduction in mortality before 65 that accounts for increased life expectancy. Although it is true that many more women are reaching old age, surviving menopause is not a new or unnatural phenomenon. The health challenges faced in old age are, like in men, the consequences of "the genetic, life-style and risk factors that influence the ageing process and the concomitant morbidity and mortality" (van Hall 1997, 60).

In North America the women's health movement has championed the view of menopause as a normal life transition. This does not mean that the transition is necessarily trouble-free, but it does remove the focus from HT as the middle-aged woman's answer to whatever is identified as the problem (Worcester and Whatley 1992). Qualitative studies exploring the experiences of menopausal and postmenopausal women reinforce the view of menopause as a natural life phase that is culturally mediated and individually experienced (Hunter, O'Dea, and Britten 1997; Hvas 2001; Stephens, Budge, and Carryer 2002; Winterich and Umberson 1999). Studies suggest that "doctors hold more negative beliefs about the menopause than women" (Hunter 1996, 119); that the positive aspects of menopause experienced by many women are frequently overwhelmed by the medical approach, which focuses on symptoms and illness (Hvas 2001); that women's reasons for using HT relate to the treatment of symptoms rather than the long-term prevention of possible disease (Hemminki and Topo 1997); and that women are interested in alternatives to HT and apprehensive about the long-term implications of this therapy (Hunter, O'Dea, and Britten 1997; Stephens, Budge, and Carryer 2002; Winterich and Umberson 1999). While women appear to resist medicalization, HT has had a significant impact on the way the menopausal and postmenopausal years are perceived and defined by women (Topo and Hemminki 1995); even women who are "critical of doctors and medication . . . rely on medical advice and a medical model of risk to make their decision" (Stephens, Budge, and Carryer 2002, 348).

Despite the predominance of the biomedical model, the unexpected results of the WHI have caused re-evaluation of this model as it relates to menopause. Smoking cessation, exercise, a healthy diet, and the maintenance of ideal body weight are being promoted as alternative means of disease prevention, and non-symptomatic women are being encouraged to avoid HT (Love 2003; American College of Obstetricians and Gynecologists 2002; Yusuf and Anand 2002). While this re-evaluation does not suggest that the view of menopause as a normal life transition is widely reflected in the literature, it does validate the many women who "tend to regard [menopause] as a part of everyday life" (Hunter, O'Dea, and Britten 1997, 1546).

2.5. THE INFLUENCE OF INDUSTRY

Commercial companies have a long history of involvement in the development and promotion of HT as a treatment for menopausal and postmenopausal women. Just like any other technology, a medical treatment may be viewed as a product, which must be promoted and diffused into the prescribing community of physicians and the consuming community of patients. The pharmaceutical industry has long been recognized for its significant expenditures for drug promotion (National Women's Health Network 2002); however, the details of its influence are only beginning to be explored in the medical literature (Nathan and Weatherall 1999). It is now recognized that industry is having considerable influence within academia and on research. Not only do many individual researchers and faculty members have close financial ties to companies whose products they are studying, but academic institutions are growing increasingly beholden to commercial companies (Angell 2000). Industry is influencing the research process in other ways: it influences the research questions that are chosen, the methodology of the studies, data analysis, whether results are published, and more (Bekelman, Li, and Gross 2003; Bodenheimer 2000; Davidoff et al. 2001; Djulbegovic et al. 2000; Lexchin et al. 2003). Practicing physicians are also targeted: sales representatives regularly visit doctors' offices with free samples and other gifts (Wazana 2000); individual physicians are paid as 'thought leaders' for their input into meetings with industry executives (Moynihan 2003b); and most professional societies rely on the sponsorship of pharmaceutical companies for continuing education endeavors (Moynihan 2003b). A careful scrutiny of the literature investigating the ties between medicine and pharmaceutical companies makes evident the profound influence of industry on the diffusion and adoption of medical innovations.

The involvement of pharmaceutical companies in developing and promoting the use of HT has a long history (Oudshoorn 1990; Wilson 1966). A measure of the industry's success can be seen in the fact that in 2001 it was noted that Premarin (produced by Wyeth-Ayerst) was "the most often prescribed brandname drug in the United States" (Meyer 2001, 782). Furthermore, a 2002 article observes the following: "in developed countries, 20-30% of women aged 45-60 years are currently estimated to use HRT" (Pitkin 2002, 13). HT has been aggressively marketed to both physicians and women through traditional sales techniques, advertisements in journals and magazines, sponsorship of various symposiums for doctors, and educational sessions for women (Palmlund 1997a). Meyer (2001) is not alone in expressing the following perspective: "the financial advantage to establishing the notion, in the collective consciousness of medical professionals and women, that fully half the world's people, once they reach midlife, require long-term, perhaps life-long pharmacological treatment is staggering" (782).

Despite the profound intertwining of industry and medicine, evidenced by recent documented cases of deliberate attempts to hold back information that would interfere with the marketing of a pharmaceutical product (Healy 2002; Kondro and Sibbald 2004; McCarthy 2000; Nathan and Weatherall 1999), the publication of the WHI study in the prestigious journal, *JAMA*, forced the medical establishment to re-evaluate one of the most frequently prescribed therapies in the Western World. Having heavily criticized or ignored previous studies suggesting that HT should not be prescribed ubiquitously to menopausal women (Herrington and Howard 2003), doctors have been left without a clear cut paradigm within which to view women and this pharmacological therapy (National Women's Health Network 2002). Despite increasing introspection in the published medical literature about the role of industry in the practice of medicine (Nathan and Weatherall 1999), many doctors and women remain unaware of the impact of industry on the promotion of HT.

2.6 CONTENT ANALYSIS AND THE MENOPAUSE LITERATURE

Content analysis, a systematic method of categorizing text to quantify particular characteristics, is an effective way of investigating the role of published literature in the diffusion of information related to HT and of exploring concepts that may not be directly observable but which can be represented by one or more indicators (Neuendorf 2002). While it is established that the medical literature is central to the practice of evidence-based medicine (Gonzales, Ringeisen, and Chambers 2002), consumer literature is an important way in which women learn about health issues. Clinkingbeard et al. (1999), for example, found that 76% of their respondents reported receiving information about menopause from women's magazines, making this source the most frequently cited source of information about menopause. Particularly when doctors are unable or unwilling to provide desired information, women commonly turn to popular media and other printed materials for information about menopause (Jones 1999; Newton et al. 1998). Not only do books and other printed materials meet the information needs of women, they are also a medium by which the cultural notion of menopause is constructed: "women's magazines especially, with their important role in the marketing of products to women, are vehicles for creating a collective consciousness of the importance of menopause and the health risks following menopause" (Palmlund 1997b, 90). While diffusion and SWT research has paid little attention to the function of the literature in change, it is clear that written material plays a role in the diffusion of information about innovation.

In order to explore various factors related to the menopause and HT, a small number of studies have utilized content analysis as a means of drawing inferences from medical and consumer texts. This research method uses a set of procedures which allow the researcher to systematically identify information about "the sender(s) of the message, the message itself, or the audience of the message" (Weber 1990, 9). In the menopause studies utilizing this method, researchers explored factors impacting attitudes towards menopause (Gannon and Stevens 1998), the content and development of public discussion on HT (Topo 1997), the "ways in which menopause and women's bodies" are characterized in self-help texts (Lyons and Griffin 2003, 1629), and the various stereotypes that are evident in menopause-related literature (Shoebridge and Steed 1999). Other articles that explored texts and drew inferences without utilizing content analysis include Palmlund (1997), who noted that advertisements in medical journals provided “elucidating insights” (160) into the subliminal promotion of HT to physicians, and Carlson and Holm (1997), who found that consumer articles blended opinion with fact, and that physicians espousing the medicalization of menopause were quoted most often in articles about menopause.

2.7 CONCLUSION

Given that the spread of information concerning innovation to members of a social system is fundamental to the diffusion process (Kortelainen 1997), an understanding of the inferences contained within texts on menopause can provide important insights into the role of published literature. The pervasive acceptance of HT for menopausal women, the dissonance that was introduced by the WHI study, and the subsequent re-evaluation of HT as a long-term preventative therapy, demonstrates that diffusion is not a linear progression. It is a complex and interrelated process that is being continuously impacted by new information that forces the reassessment of previous practices and paradigms (Rogers 1995). By utilizing content analysis, the impact of the WHI on medical and consumer texts can be evaluated and the role of the literature, both prior to and following the publication of the WHI findings, can be explored.

CHAPTER 3

RESEARCH METHODS

This chapter will address the following: research questions, the method of content analysis, definition of key terms, unit of analysis, sample limits and sampling methods, the impact of the pilot study, variables and data analysis, and the limitations of the study.

3.1 RESEARCH QUESTIONS

Using content analysis of a random sample of medical and consumer articles, this exploratory study addressed the following research questions:

1. How did the published results of the WHI study influence medical and consumer literature and what role did the literature play in the I-D process related to HT as a long-term preventative therapy for menopausal and postmenopausal women?
2. Given that published literature provides a conduit through which information flows within and between networks, what role did varying tie strength and the presence of 'weak trusted ties' play in the I-D process?
3. How has the WHI study impacted the expression of the biomedical model vs. normal life transition model within the literature?
4. How was the medicalization of menopause expressed in the sample of medical and consumer articles?
5. Given the acknowledged impact of industry in medicine, how did industry influence articles in the sample?

3.2 CONTENT ANALYSIS

One way to investigate the research questions posed in this study is to use content analysis, a "summarizing, quantitative analysis of messages" (Neuendorf 2002, 10) that can be used to "make valid inferences from text" (Weber 1990, 9).

Content analysis is a systematic method for categorizing text to quantify particular characteristics. This method was chosen for the following reasons: (1) content analysis summarizes information rather than reporting all details and thus seeks "to generate generalizable conclusions . . . [rather than] focusing on a full and precise conclusion about a particular case" (Neuendorf 2002, 15); (2) this research method operates directly on the text, thus focusing on the message that is being communicated and allowing the description of trends in communication content; (3) since published literature, unlike information posted in websites or presented at conferences, exists over time, this research method allows the analysis of different features as they are held within the text at a given time and facilitates an analysis of change; and (4) this research method allows one to consider not only content that is directly countable, but also *latent* content, which consists of "unobserved concepts that cannot be measured directly but can be represented or measured by one or more indicators" (Neuendorf 2002, 23).

3.3 DEFINITIONS

The following definitions informed this study and the variables used for content analysis:

- *Menopause* refers specifically to the cessation of menstruation (Friel 1977); however, for the purposes of this study, the more colloquial definition of menopause was used: the period of time during which sex hormone production decreases and regular menstrual periods come to an end. In some medical texts this broad period of time is also described as the *perimenopause*, and in European texts and older North American texts this time period is referred to as the *climacterium. Postmenopausal* was used in this study to describe the physiological state of women following the cessation of regular menstrual periods.
- Although commonly referred to as *hormone replacement therapy* or *HRT*, the more neutral term, *hormone therapy* (*HT*) was used for this study. While the former term evolved as an expression of the view that

postmenopausal women suffer from a deficiency disease that should be resolved through the exogenous replacement of lacking elements (Worcester and Whatley 1992), HT is a neutral term that can be applied to variations of estrogen or estrogen combined with progestin, and to the delivery of these hormones in varying formats.

- There is distinction between the use of HT on a short-term basis in order to deal with potentially disruptive menopausal symptoms (such as hot flushes, sleep disturbance or mood swings) experienced by some women during and following menopause, and the long-term use of HT for primary prevention of osteoporosis, cardiac disease or cognitive decline. This distinction has been blurred by the evolving, informal reclassification of these maladies as "diseases caused by menopause" (Love 2003, 4). With their identification as supposed estrogen-deficiency diseases, these ailments have come to be practically identified as *symptoms* of menopause (Worcester and Whatley 1992). For this study, "symptom" is used to refer to the concrete, generally short-term symptoms (for example, hot flushes) associated with menopause or postmenopause, and "*symptom*" (italicized) will be used to encompass both short-term symptoms and those diseases which, although more accurately viewed as consequences of hormone loss, have come to be identified as potential symptoms of hormone deficiency.
- While *innovation* in clinical medical practice occurs primarily in two ways, through dramatic breakthroughs that introduce new concepts, treatments or drugs, or through incremental improvements (Charlton 1999), the *innovation-decision* (I-D) *process* is the process through which individuals or decision-making units pass from first knowledge of innovation, to attitude formation, and to the decision to adopt or reject the innovation. Following the adoption decision, there are two more stages in the I-D process: issues related to implementation of the new idea or innovation may be dealt with, and adoption confirmation occurs. This latter stage may result in re-evaluation and a post-adoption decision to reject the innovation (Rogers 1995).

- The *biomedical model*, as it relates to menopause, was used to represent the view that menopause heralds the onset of deficiency disease and a time of significant risk to women's health and well-being. With this perspective comes a biological explanation for the experiences of women at this stage of life and the assumption that medical intervention is both desirable and prudent. The *normal life transition model*, on the other hand, was used to represent the view that menopause is a "normal, healthy transition phase of a woman's life when her body has within it all the mechanisms necessary to gradually change from dealing with demanding reproductive cycles to meeting the different, postproduction, physiological needs of postmenopause" (Worcester and Whatley 1992, 8).

3.4 UNIT OF ANALYSIS

For the purposes of this study, the unit of analysis was articles published in both medical and consumer publications. By analyzing article content as it is held within the text at a given time, this study was able to explore the role and impact of the literature over time. Texts were based on paper-published material since web content does not remain static. In addition, it was found that many consumer publications use reprints from paper-published magazines in their online articles. For example, articles published in *Online Chatelaine* under 'health and fitness' were reprints of what had appeared in the paper-published magazine on a previous date. Analysis of what appeared in paper-published magazines over time represented articles people were reading in the websites of consumer publications.

3.5 SAMPLING

3.5.1 Sample Limits

Articles published from 1999 to the most recently available issues at the time of sampling, October 2003, were included in the sampling frame. This allowed the analysis of articles prior to the initial publication of Women's Health Initiative (WHI) results, and in the time that has passed since July 2002, thus facilitating analysis of change. The earliest date chosen for inclusion in the sampling frame, 1999, was selected in order to provide data that would reflect the environment related to HT in the years immediately prior to the publication of WHI results. Only publications available in English and accessible in full text were included in the study.

3.5.2 Sampling Method: Consumer Magazines

The goal of the consumer portion of the research sample was to select a representative sample of articles from a variety of consumer publications read by Canadian women. This allowed an analysis of the information that Canadian women were commonly accessing as they directly or indirectly learnt about menopause and HT. Consumer articles for inclusion in the sampling frame were selected using the following procedure:

- Women's or news magazines listed in the 2002-2003 edition of *Media Digest* (Canadian Media Director's Council 2002-2003) were selected if they met the following criteria: information obtained from *Publication Profiles* (Rogers Media Inc. 2003) verified that the scope incorporated health issues and that the target audience included women 40+ years of age; there was database access to the magazine and thus the ability to search content using specified key terms; and, full text was available either through the public library or online through the University of Alberta Libraries. The five publications meeting the criteria and with the highest average number of female readers per issue, as indicated in *Media Digest* (2002-2003), were selected and searched for articles, which contributed to the sampling frame. Selected publications were *Reader's Digest*, *Chatelaine*, *Canadian Living*, *Homemaker's Magazine*, and *Maclean's*.

- The sampling frame was further supplemented by articles accessed through the database *CPI.Q (Canadian Periodicals Index)* in order to include material from a "comprehensive list of Canadian and International journals, magazines, selected sections of the Globe and Mail, Canadian biographies and other reference content from Gale Group, all with a Canadian focus" (Gale Group Inc. 2003). Medical journals included in CPI.Q, for example the *Canadian Medical Association Journal*, were excluded from the consumer portion of the sampling frame. The following additional publications from the database search were included: *A Friend Indeed*, *Business Week*, *Consumer Reports on Health*, *Fortune*, *Globe & Mail*, *Herizons*, *Newsweek*, *Prevention*, *Time Canada*, and *U.S. News & World Report*.
- The sampling frame was selected using a combination of search terms representing the concept of HT, and the concept of menopause and postmenopause.

3.5.3 Sampling Method: Medical Journals

The goal of the medical portion of the research sample was to select a representative sample of articles from a variety of medical publications read by Canadian physicians. This allowed an analysis of the information that Canadian physicians were commonly accessing as they directly or indirectly learnt about menopause and HT. Since there was no readily available source that compiled circulation figures for groups of medical journals and also because increasing access to online resources such as PubMed has decreased dependence on individual subscriptions to medical journals, publications for the sample were selected based on Canadian origins and representation of major medical associations. Personal correspondence with a librarian at the John W. Scott Health Sciences Library confirmed that there is increasing reliance on electronic access to medical articles and that personal subscriptions of physicians are usually related to the professional organizations to which they belong. Medical articles for inclusion in the sampling frame were selected using the following procedure:

- *Publication Profiles* (Rogers Media Inc. 2003) was used to verify the Canadian origins and scope of the Canadian portion of the sampling frame. Journals were chosen if they had national scope, were relevant to general practitioners as well as specialists in Obstetrics and Gynecology, and were available in full text either online or through the John W. Scott Health Sciences Library. Selected publications were *Canadian Family Physician*, *Canadian Medical Association Journal*, *The Journal of Obstetrics and Gyneacology Canada*, and *The Medical Post*.
- Primary journals published by the American Medical Association and British Medical Association were also be chosen for inclusion in the sampling frame as they are prominent journals that are relevant to Canadian general practitioners and specialists in Obstetrics and Gynecology. These publications were the *Journal of the American Medical Association*, and *British Medical Association Journal*.
- As was done in the consumer portion of article selection, the sampling frame was selected using a combination of search terms representing the concept of HT and the concept of menopause and postmenopause.

3.5.4 Sampling Frame and Stratified Random Sample

Using the previously outlined procedure, the sampling frame was established: 57 articles from consumer publications (21 pre- WHI, 36 post-WHI) and 84 articles from medical publications (46 pre-WHI, 38 post-WHI) were identified. Following completion of the pilot study (see following discussion), it was determined that the stratified, random sample for this thesis would be composed of one out of every three articles in the sampling frame. Using a random numbers table (Anderson, Sweeney, and Williams 1993), seven pre-WHI and 13 post-WHI consumer articles, and 16 pre-WHI and 13 post-WHI medical articles were selected for analysis. Thus, the total number of articles in the sample was 49. Please see appendix A for the list of consumer and medical articles in the stratified random sample.

3.6 PILOT STUDY

A ten-article sample of convenience composed of equal numbers of consumer and medical articles and equal numbers of pre-WHI and post-WHI articles was chosen for the pilot study. Articles represented a cross section of different publications and article types found in the sampling frame. A content analysis worksheet was developed and tested; the worksheet allowed observations regarding variables as well as the assignment of specific values. The pilot study made apparent the shortcomings of a number of variables and the need for more specific definitions. The following changes were made: more detailed definitions were developed for each I-D stage and for innovation attributes; author roles, identification of quoted individual, and major themes were clarified; symptoms and HT role related to symptoms were delineated more clearly; and, new variables were added. This pilot phase proved valuable as it was determined that the worksheet was an effective data collection tool and that, with the noted improvements, content analysis was effective and straightforward.

3.7 VARIABLES AND DATA ANALYSIS

Variables for content analysis were developed in accordance with the research questions posed in this study. Please see appendix B for a list of the final variables used in content analysis. Abbreviated variable definitions are included in this appendix, and variables analyzed and used for specific research questions are noted. Data analysis of values was accomplished by using the program, Statistical Package for the Social Sciences (SPSS); frequencies were compiled, and chisquare and Cramer's V tests were performed on selected variables in order to determine the statistical significance of associations between some variables. In a number of cases, variable values were collapsed at the data analysis phase in order to reduce the number of categories being analyzed. Appendix B includes final values used for data analysis.

3.8 STUDY LIMITATIONS

This study was limited by the inclusion criteria used in selecting sampling frame articles: because articles were selected on the basis of search terms representing both HT and menopause, articles that were not indexed as addressing HT were rejected. Although it was found that articles noting HT alternatives tended to also mention HT, and indexing generally noted HT if it was mentioned at all, it is, nonetheless, likely that the sample of articles was biased to some degree towards the biomedical model and a medicalized view of menopause. Indexing practices within databases could have also limited the reliability of results.

This study was limited in its ability to address industry influence on the sample of articles. This was an inherent limitation related to current disclosure practices of journals. Although investigation of other sources might have revealed information about potential industry ties of quoted sources or authors, this was outside the scope of this content analysis.

Since a single coder performed content analysis, consistency could not be established. This limitation was addressed by the pilot study, which allowed exploration of the research method as well as of variable definitions. Following the pilot study, the problem of analytic consistency was further addressed through the development of detailed definitions for variables and values, and the prominent display of these definitions throughout the study's content analysis phase.

3.9 CONCLUSION

Content analysis of medical and consumer articles was used in this exploratory study to address questions related to the role of published literature in medical innovation and change. A detailed list of variables and values was drawn up based on the research questions and reviewed literature, content analysis of the stratified, random sample was performed, and SPSS was utilized for data analysis. Results of analysis and related discussions are detailed in chapter four of this thesis.

CHAPTER 4

RESULTS AND DISCUSSION

In the following chapter each research question is addressed: results of relationships between pertinent variables are given, observations are made about frequencies of interest, and results are discussed with reference to relevant research.

4.1 RESEARCH QUESTION 1: RESULTS AND DISCUSSION

Research Question 1: How did the published results of the Women's Health Initiative (WHI) study influence medical and consumer literature and what role did the literature play in the innovation-decision (I-D) process of hormone therapy (HT) as a long-term preventative therapy for menopausal and postmenopausal women?

To investigate the first research question presented in this exploratory study, articles expressing characteristics of the different I-D stages (knowledge acquisition, persuasion, decision, implementation, and confirmation) were identified and relationships between articles in individual stages and other pertinent variables were analyzed. In addition, articles in the confirmation stage were further divided into five categories delineating their function within the confirmation stage: avoids dissonance, stimulates re-assessment, discusses discontinuance, discusses variant HT use, and discusses HT alternatives. Relationships between the various groups of confirmation stage articles and other variables were then examined. Variable frequencies within samples as well as statistically significant relationships (significant at $p < .05$ unless otherwise stated) are used to articulate the results of this exploration and as a basis for discussion.

It is important to highlight that the stages of the decision process may not be completely distinctive. Rogers (1995) notes that knowledge acquisition and decision stages are relatively obvious, persuasion is less so and the distinctiveness of implementation and confirmation is even less clear. As a result, articles in the sample may have been judged as having characteristics of more than one I-D stage.

4.1.1 Knowledge Acquisition

Articles expressing characteristics of the I-D stage, knowledge acquisition (KA), were proportionately low in the random sample: 8.2% (n = 4) were identified as KA articles, while 91.8% (n = 45) were identified as being in other I-D stages. In light of Rogers' (1995) explanation of the KA stage, a period prior to innovation adoption during which individuals are "exposed to an innovation's existence and [gain] some understanding of how it functions" (162), and in light of the sampling frame used in this exploration, 1999 to October 2003, the low frequency of articles from this I-D stage found in the random sample was anticipated.

As discussed previously, long-term HT as a means of disease prevention and health maintenance for menopausal and postmenopausal women had been, with some fluctuation, aggressively marketed to prescribing physicians and consumers since the 1960s (Palmlund 1997a; Kaufert and Lock 1997). The inundation of persuasive information resulted in a situation described in the United Kingdom based journal, *Social Science & Medicine*: "there are few adult women under 65 who have not heard of HRT and many have thought about taking it, although it may not yet be relevant for them and they may not have discussed it with a doctor" (Griffiths 1999, 470). As a consequence of extensive marketing and widespread awareness of HT, many women and health care providers had already adopted this innovation prior to the time period included in the sampling frame of this exploratory study; therefore, the frequency of KA articles in the sample confirms that this innovation was predominantly located at a more advanced stage of the I-D process.

In order to explore the first research question, relationships between articles in the KA stage and the following variables were explored: audience, impact of the WHI study, innovation attributes, the projected tone of the article, and themes evident in the sample.

4.1.1.1 Knowledge Acquisition and Audience

Articles demonstrating features of the KA stage of the I-D process primarily targeted the consumer population: 75% (n = 3) appeared in consumer publications, while 25% (n = 1) appeared in medical publications. These proportions contrast with articles not in the KA stage: 37.8% of non-KA articles in this random sample were intended for the consumer audience, whereas 62.2% (n = 28) were published in articles intended for a medical audience. Since it is assumed that articles published in a given publication are thought to be of interest to readers, these results suggest that there is a perceived lag between consumer knowledge and the knowledge of medical personnel. In addition, it suggests that women may be later adopters of this innovation in exogenous hormone use. This is reinforced by research exploring the lack of HT 'compliance' demonstrated by women and the tendency of physicians to try to persuade women to take HT (Kaplan et al. 2002; Topo, Hemminki, and Uutela 1993).

4.1.1.2 Knowledge Acquisition and Impact of the WHI Study

Articles demonstrating characteristics of the I-D stage, KA, were all (n = 4) published prior to the release of the WHI findings on July 8th, 2002 and the published release of those findings in the *Journal of the American Medical Association* (*JAMA*) on July 17th, 2002. They were, therefore, not impacted by the results of the WHI. Articles not in the KA stage were represented in both the group of articles demonstrating no WHI impact (44.4%, n = 20) and the group impacted by the WHI (55.6%, n = 25). The finding that KA articles were not impacted by the WHI is consistent with anticipated results, based on Rogers' (1995) description of the I-D process. Because the WHI produced intense dissonance, which was brought to the attention of adopters and potential adopters through extensive coverage in both medical and lay texts, articles published following the release of WHI findings took on an evaluative tone. The I-D process was thus taken beyond the stage of providing awareness-knowledge, how-to knowledge or principles-knowledge.

4.1.1.3 Knowledge Acquisition and Innovation Attributes

Articles in the KA stage of the I-D process focused on the positive attributes of this innovation. All of the articles in the KA stage (n = 4) presented the relative advantages of HT as a long-term preventative therapy; whereas, 25% (n = 8) of the non-KA articles presented HT's relative advantage and 75% (n = 24) presented the view that HT does not have relative advantage for adopters. While a smaller number of total articles addressed compatibility (33 of 49), all of the KA stage articles (n = 4) presented the idea that long-term HT was compatible with the beliefs, values or needs of adopters; 41.4% (n = 12) of non-KA articles presented this idea while 58.6% (n = 17) pointed out that HT is not compatible. Only a single article in the KA group discussed complexity and this article functioned to encourage adoption by focusing on the decreased complexity of HT. A small percentage of non-KA articles, which discussed this attribute, focused on the decreased complexity of HT (14.3%, n = 5), but 85.7% (n = 30) of the non-KA articles discouraged adoption by providing information that increased perceived complexity of HT as a long-term preventative therapy. KA articles (n = 4) were equally divided between those promoting the trialability of long-term HT and those that did not. Finally, the three KA articles that addressed observability all functioned to potentially stimulate adoption by suggesting or demonstrating that the positive benefits of HT were observable. This contrasted with non-KA articles; 24% (n = 6) of the non-KA articles discussing observability communicated that HT had observable benefit, whereas 76% (n = 19) facilitated the rejection of long-term HT by presenting the view that benefit is not observable.

Rogers (1995) notes that the "perceived attributes of an innovation are one important explanation of the rate of adoption of an innovation" (206) and that communication channels and innovation attributes "may interact to slow down or speed up the rate of adoption" (207). Results suggest that the KA articles in this random sample may have functioned as a channel that encouraged the adoption of HT, as a standard, long-term therapy for menopausal and postmenopausal women, through the positive presentation of innovation attributes.

4.1.1.4 Knowledge Acquisition and Projected Tone

In the KA stage articles, 100% (n = 4) expressed an overall positive view of HT as a long-term preventative therapy. Non-KA articles, on the other hand, presented a less positive tone: 20% (n = 9) projected an overall positive tone; 40% (n = 18) projected an overall neutral tone; and 40% (n = 18) projected an overall negative tone. Although the number of KA articles in the random sample was very small, these results are an indication of the positive press received by long-term preventative HT in the years immediately before the early termination of the estrogen plus progestin trial within the WHI study. This positive presentation of innovation attributes occurred based on "observational data and extrapolation from a selective emphasis of the favorable effects on surrogate outcomes" (Yusuf and Anand 2002, 357) and in the absence of well designed, large RCTs proving the long-term efficacy and safety of this therapy.

4.1.1.5 Knowledge Acquisition and Major Themes

During this phase of the I-D process, articles focused on the following themes: 'HT as preventative therapy' (100%, n = 4), and 'HT as symptom relief' (75%, n = 3). 'Scientific information' was the theme of only one article (25%). There were no KA articles with the following themes: 'health promotion,' 'HT alternatives,' 'dissent prior to WHI,' 'HT as risk,' 'dissonance following WHI,' or 'other'. This focus within the KA articles demonstrates a critical factor in the innovation-knowledge process: an individual must not only know about an innovation, it must also be regarded as relevant to the individual's situation and potentially useful (Rogers 1995). By focusing primarily on 'HT as symptom relief' and 'HT as prevention,' these articles position knowledge acquisition as both relevant (symptom relief is the main reason women give for taking HT (Hunter, O'Dea, and Britten 1997)) and useful (by taking preventative HT women are promised protection from the otherwise inevitable decay of their aging bodies (Kaufert and Lock 1997)).

4.1.1.6 Conclusion: Knowledge Acquisition Stage Articles

Sample size within the KA stage was not large enough to produce any statistically significant relationships. Nonetheless, results suggest that the KA articles in the random sample demonstrated characteristics of the I-D KA stage as discussed by Rogers (1995). Primarily targeting the consumer audience, this group of articles focused on the positive attributes of long-term preventative HT and expressed an overall positive view of this therapy. WHI results did not influence these results as they were published prior to July 2002. Despite the lack of articles with thematic focus on 'scientific information,' this group of articles played a role in the I-D process by providing readers with knowledge of HT that might contribute to an adoption decision.

4.1.2 Persuasion

Articles expressing characteristics of the second I-D stage, persuasion, represented a minority of the articles in the random sample: 14.3% (n = 7) were persuasion articles, whereas 85.7% (n = 42) were identified as representing other I-D stages. Given that the medical establishment, prescribing doctors, and users had already adopted HT as a preventative treatment for menopausal and postmenopausal women, it was anticipated that only a minority of articles within the sampling frame would represent this I-D stage.

In order to explore the first research question, relationships between articles in the persuasion stage and the following variables were explored: audience, impact of the WHI study, innovation attributes, the projected tone of the article, and themes evident in the sample.

4.1.2.1 Persuasion and Audience

A greater proportion of the articles demonstrating persuasion stage characteristics were intended for the consumer audience (71.5%, n = 5) than for the medical audience (28.6%, n = 2). This contrasts with the non-persuasion stage articles: 35.7% (n = 15) were written for a consumer audience, whereas 64.3% (n =27) were written for a medical audience. As with the KA articles, these results suggest that consumers may be later adopters of this innovation than physicians. Persuasion stage articles are thus aimed at a consumer audience that has received knowledge about the innovation but has not yet adopted it. Rogers (1995) notes that during this stage in the innovation adoption curve, an *attitude-adoption gap* may develop: the potential adopter may form a favorable opinion and yet overt behaviour change does not occur . This is particularly evident for preventive innovations such as long-term HT, an innovation that may be adopted "in order to avoid the possible occurrence of some unwanted event in the future" (Rogers 1995, 170).

4.1.2.2 Persuasion and Impact

All of the persuasion articles (n = 7) fell in the pre-WHI period and thus demonstrated no impact from this study. In the non-persuasion stage articles 40.5% (n = 17) were not impacted by the WHI, whereas 59.5% (n = 25) were impacted by WHI findings. Since all innovations involve some degree of uncertainty, the persuasion stage is one in which the potential adopter may seek evaluative information about the consequences or advantages of HT. It was anticipated that persuasion stage articles would fall in the pre-WHI time period because the information emerging from the WHI created dissonance that disrupted the marketing and adoption of this innovation.

4.1.2.3 Persuasion and Innovation Attributes

Articles in the persuasion stage of the I-D process tend to focus on the positive attributes of this innovation in such a way as to potentially stimulate innovation adoption. All of the persuasion stage articles addressing relative advantage (100%, n = 6) presented long-term HT as having relative advantage over other potential therapies; only 20% (n = 6) of non-persuasion stage articles presented HT as having relative advantage. Persuasion articles presented long-term HT as being compatible with the beliefs, values and/or needs of potential adopters (100%, n = 6); only 37% (n = 10) of non-persuasion stage articles presented long-term HT as compatible. Only two persuasion stage articles addressed the perceived complexity of this therapy and both functioned to potentially stimulate adoption by providing information that decreased the perceived complexity of HT. These results contrast with non-persuasion articles addressing this innovation attribute: only 11.8% (n = 4) provided information that decreased the perceived complexity of HT and 88.2% (n = 30) functioned to potentially discouraged adoption by addressing the complexity of HT as a long-term preventative therapy. The four persuasion articles, which addressed observability, all stimulated adoption by suggesting or demonstrating that the positive benefits of HT were observable. Once again this contrasted with non-persuasion articles: 79.2% (n = 19) presented the view that benefit from this preventative therapy is not observable. Persuasion articles did not address the trialability of this innovation.

It is interesting to note similarity between the presentation of innovation attributes in the KA and persuasion articles. These I-D stages precede the decision stage and, in this exploratory study, articles in both of these stages functioned to encourage a primarily consumer audience to adopt long-term preventative HT by presenting innovation attributes in a very positive light. Rogers (1995) notes that particularly at the persuasion stage, the perceived attributes of an innovation play a critical role in developing a positive attitude, which will facilitate innovation adoption. The random sample illustrates the important role of the literature in impacting the perceptions of readers and thus impacting the I-D process.

4.1.2.4 Persuasion and Projected Tone

Consistent with the presentation of innovation attributes, 100% (n = 7) of articles expressing persuasion stage characteristics expressed an overall positive view of HT as a long-term preventative therapy for menopausal or postmenopausal women. Only 11.1% (n = 6) of non-persuasion stage articles expressed an overall positive view of this therapy, while 42.9% (n = 18) presented a neutral view of HT and the same percentage expressed an overall negative view of long-term HT. These results suggest that although the overall tone in the sample was ambivalent towards HT as a long-term preventative therapy, presentation of HT was positive in the persuasion stage articles. This unbridled, positive presentation of HT, despite the lack of large RCTs confirming efficacy and safety, mirrored the presentation of HT by some physicians to their patients. Winterich and Umberson (1999) in their qualitative analysis of women's menopausal experiences found that HT was presented to women in an overwhelmingly positive light as physicians attempted to persuaded their patients to initiate preventative HT.

4.1.2.5 Persuasion and Major Themes

During this second phase of the I-D process, articles primarily focused on the following themes: 'HT as preventative therapy' (85.7%, n = 6) and 'HT as symptom relief' (71.4%, n = 5). The presentation of scientific information emerged as a theme in only 28.6% (n = 2) of the articles and 'HT as risk' was a major theme in a single article (14.3%). There were no persuasion stage articles that focused on the themes 'health promotion,' 'HT alternatives' 'dissent prior to WHI,' 'dissonance following WHI' or 'other'.

The relationship between articles in the persuasion stage of the I-D process and the 'HT as symptom relief' was statistically significant ($\chi^2 = 8.446$, df = 1). In light of the fact that women cite symptom relief as their primary reason for using HT (Hunter, O'Dea, and Britten 1997) and that 71.5% of the persuasion stage articles were in consumer publications, it is not surprising that 'HT as symptom relief' emerged as a common theme in articles that function to promote a positive innovation adoption decision.

4.1.2.6 Conclusion: Persuasion Stage Articles

Only a small portion of the random sample were persuasion stage articles; these articles were published in the pre-WHI time period. Found predominantly in consumer publications, results suggest that consumers may be later adopters of this innovation than physicians. While fostering a positive perception of innovation attributes, persuasion articles primarily focused on the themes 'HT as preventative therapy' and 'HT as symptom relief.'

4.1.3 Decision

There were very few articles in the sample expressing characteristics of the third I-D stage, decision: 4.1% (n = 2) were identified as being decision stage articles, whereas 95.9% (n = 47) of the random sample were identified as belonging to other I-D stages. These results suggest that during the chosen time frame of the sample (1999 to October 2003) there was little focus in the consumer or medical literature on the actual decision to use this innovation. There are two primary reasons for this finding: (1) the decision to adopt or reject an innovation is active and, although it may be discussed in the literature (for example, the discussion of women's reluctance to fill HT prescriptions (Pitkin 2002) is, to some degree, a discussion of women's decisions to adopt or reject therapy), one is more likely to find discussion of innovation development, marketing and adoption consequences in the published literature; and (2) prescribing doctors, women and the medical establishment had already largely adopted HT as a long-term preventative treatment and, therefore, the majority of articles in the random sample had characteristics of later I-D stages.

In order to explore the first research question, relationships between articles in the decision stage and the following variables were explored: audience, impact of the WHI study, innovation attributes, the projected tone of the article, and themes evident in the sample. Because the sample size was so small, there were no statistically significant relationships.

4.1.3.1 Decision and Audience

Both of the decision stage articles in the sample appeared in consumer publications. This suggests that by 1999, the beginning of the sampling frame, the medical literature had moved beyond the adoption decision and was more concerned with the problems of implementation. This suggestion is fortified by the fact that 75% (n =18) of the articles in the implementation stage appeared in medical publications.

4.1.3.2 Decision and Impact

Articles demonstrating characteristics of the decision stage were published before the early release of WHI findings in July 2002 and were thus not impacted by this landmark study. This finding was anticipated as the well-publicized dissonance created by WHI results moved this innovation past the decision stage and into the latter stages of the I-D process.

4.1.3.3 Decision and Innovation Attributes

Decision stage articles (n = 2) addressed three innovation attributes and in all cases innovation adoption was promoted by focusing positively on the relative advantage, compatibility, and observability of long-term preventative HT. Articles in this I-D stage did not address the complexity or trialability of this innovation. Although Rogers (1995) identifies innovation attributes as being particularly critical in the persuasion stage of an innovation, he also notes that the receiver's perception of attributes contributes at all stages of the I-D process. Despite the small number of decision stage articles, these articles do suggest that perception of attributes is important at this I-D stage.

4.1.3.4 Decision and Projected Tone

Both decision stage articles expressed a positive view of long-term preventative HT, whereas the minority of non-decision stage articles expressed an overall positive view (23.4%, n = 11) and the rest of the non-decision stage articles were equally divided between those expressing a neutral view (38.3%, n = 18) and those expressing an overall negative or cautious view (38.3%, n = 18). The complete endorsement of long-term HT by decision stage articles may be an indication of the pre-WHI environment in which HT was viewed as the sensible choice for forward thinking women (Seaman 2003).

4.1.3.5 Decision and Major Themes

During this stage of the I-D process, thematic focus of articles was identical: both articles focused on 'HT as preventative therapy' and 'HT as symptom relief'; neither article focused on 'scientific information,' 'health promotion,' 'HT alternatives,' 'dissent prior to WHI,' or 'HT as risk'. Although few articles fit into the I-D decision stage, this data suggests that articles promoting an adoption decision focused on symptoms and disease prevention rather than therapy risk assessment or exploration of diverse ways to approach this life phase.

4.1.3.6 Conclusion: Decision Stage Articles

The very few articles expressing decision stage characteristics appeared in pre-WHI, consumer publications and focused positively on innovation attributes, thus fostering a positive view of long-term preventative HT. Findings suggest that articles promoting an adoption decision focused on symptoms or the threat of disease and that those who read consumer publications may be later adopters of long-term HT.

4.1.4 **Implementation**

Forty-nine percent (n = 24) of the articles in the sample were identified as having features related to the I-D implementation stage. For the purposes of this exploratory study, implementation stage articles were identified if they demonstrated or assumed adoption but addressed post-adoption questions relating to how HT was used, how it worked in practice, operational problems that may be encountered and how they might be solved.

In order to explore the first research question, relationships between articles in the implementation stage and the following variables were explored: audience, impact of the WHI study, innovation attributes, the projected tone of the article, and themes evident in the sample.

4.1.4.1 Implementation and Audience

There was a statistically significant relationship between articles in the implementation stage and audience ($\chi^2 = 4.871$, df = 1). While only 25% (n = 6) of the implementation stage articles were consumer publications, 75% (n = 18) were medical publications. In non-implementation stage articles, 56% (n = 14) were from consumer publications and 44% (n = 11) from medical publications. This indicates that there was a much higher than expected number of implementation stage articles in medical publications and confirms that "much active information-seeking usually takes place at the implementation stage" (Rogers 1995, 173). These results suggest that although HT had been adopted as appropriate long-term preventative treatment for menopausal and post-menopausal women, "a certain degree of uncertainty about the expected consequences of the innovation still exist[ed]" (Rogers 1995, 173).

4.1.4.2 Implementation and Impact

The proportion of implementation stage articles not impacted by WHI findings (70.8%, n = 17) was much greater than the proportion impacted by the WHI (29.2%, n = 7). Conversely, 28% (n = 7) of non-implementation stage articles were not impacted by the WHI findings, whereas 72% (n = 18) were impacted. A statistically significant relationship was, therefore, found between articles in the implementation stage and impact from the WHI study ($\chi^2 = 8.99$, df = 1, $p < .005$).

The relationship between articles in the implementation stage and the impact of the WHI suggests that despite the adoption of HT as an appropriate and commonly recommended long-term preventative treatment for menopausal and post-menopausal women, there was a high degree of uncertainty about the expected consequences of this innovation even before the release of the WHI study. While this uncertainty does not appear to have made its way into the consumer articles within the sample, the medical articles give evidence that despite adoption, there was recognition that important questions still needed to be explored. This finding raises questions about the widespread assumption of positive therapeutic benefit communicated in the medical and consumer literature (Anonymous 1995; Genazzani and Gambacciani 2001), while at the same time a considerable number of medical articles were focusing on uncertainties related to HT adoption by prescribing doctors and their patients.

4.1.4.3 Implementation and Innovation Attributes

At this stage of the I-D process, innovation attributes began to be presented in a more ambiguous manner. Of those implementation stage articles addressing the relative advantage of long-term HT, only 33.3% (n = 5) promoted this attribute to prescribers or users, while 66.7% (n = 10) indicated that long-term HT does not have relative advantage for adopters; 18.2% (n = 4) of implementation stage articles addressing complexity promoted the adoption of long-term HT by decreasing perception of complexity, while 81.8% (n = 18) presented information that increased perceived complexity; and while only 33.3% (n = 5) of implementation stage articles addressing observability facilitated adoption by increasing the degree to which positive results of long-term HT were observable to readers, 66.7% (n = 10) of articles demonstrated that positive benefits of HT were not observable. Although 58.3% (n = 7) of implementation stage articles addressing compatibility promoted the compatibility of long-term HT with existing beliefs, values and/or needs of readers, these numbers reflect a noteworthy shift in the literature. All of the KA, persuasion, and decision articles, which addressed compatibility, communicated that HT was compatible with the beliefs, values and/or needs of readers. Very few articles in the implementation stage addressed innovation trialability (n = 2).

These results suggest that despite the presumption of benefit, which was marketed to prescribing physicians through continuing education events, conferences, and informational material (National Women's Health Network 2002), there was a considerable proportion of implementation stage articles in the literature and these articles, taken as a whole, were evidently ambiguous about the perceived attributes of this innovation.

4.1.4.4 Implementation and Projected Tone

Implementation stage articles were most likely to have to neutral tone towards HT as a long-term preventative therapy: 45.8% (n = 11) were neutral in tone, 25% (n = 6) were positive in tone towards HT, and 29.2% (n = 7) expressed a negative or cautious view of HT as a long-term therapy for menopausal or postmenopausal women. This suggests that despite the view that poor HT continuance was a major barrier in the medical management of menopause (Kaplan et al. 2002; Pitkin 2002; Thompson 1995) and the advice that doctors initiate discussions regarding HT with middle-aged women (Topo 1997), the literature was expressing reservations about adoption of this innovation.

4.1.4.5 Implementation and Major Themes

Table 1 shows the proportion of implementation stage articles that focused on the major themes used for content analysis. Since proportionally fewer than expected implementation articles focused thematically on 'symptom relief', the relationship between articles in this I-D stage and the theme 'symptom relief' was significant ($\chi^2 = 4.751$, df = 1). A relationship was also found between implementation articles and the theme 'HT as risk' ($\chi^2 = 4.306$, df = 1); a higher than expected proportion of implementation articles discussed this theme. These results suggest that the 'scientific information' was more important in implementation articles than it had been in articles demonstrating earlier I-D stages and that there was increased focus on HT's potential risk to women and, indirectly, to prescribing doctors. Furthermore, the dramatically increased attention to 'scientific information' and 'HT as risk' provides additional evidence of the dissent about HT arising during the implementation stage. The decreased attention to symptom relief may be attributed to the increased focus on HT as a long-term preventative therapy, a focus that dominated the literature during the 1990s.

Table 1. Thematic focus of implementation stage articles

Theme	Percentage of Articles Discussing Theme
Scientific information	70.8% (n = 17)
HT as risk	37.5% (n = 9) *
HT as prevention	33.3% (n = 8)
Dissent prior to WHI	25% (n = 6)
Dissonance following WHI	16.7% (n = 4)
Other themes	16.7% (n = 4)
Symptom relief	12.5% (n = 3) *
Health promotion	8.3% (n = 2)
HT alternatives	4.2% (n = 1)

* Statistically significant relationship

4.1.4.6 Conclusion: Implementation Articles

Almost half of the articles in the random sample had characteristics of the implementation stage and a higher than expected proportion of these articles was published pre-WHI, in medical publications, and particularly in peer-reviewed literature. In a noteworthy departure from the positive presentation of attributes evident in the earlier I-D stages, articles in the implementation stage presented innovation attributes ambiguously and proportionally fewer articles than expected focused thematically on 'symptom relief.' A higher than expected proportion of implementation articles focused thematically on 'HT as risk' and 'scientific information' became a more important theme than it had been at earlier I-D stages. Results suggest that despite the adoption of HT as an accepted long-term preventative treatment for middle-aged and older women, there was a striking degree of uncertainty about the expected consequences of this innovation even before the release of WHI results. The published literature played a fundamental role in elucidating this uncertainty.

4.1.5 Confirmation

A majority of articles in the random sample expressed characteristics of the final I-D stage, confirmation (71.4%, n = 35). The fact that almost three quarters of the random sample had confirmation stage characteristics confirms that despite pervasive innovation adoption, "a decision to adopt . . . is often not the terminal stage in the innovation-decision process" (Rogers 1995, 180).

In order to explore the first research question, relationships between articles in the confirmation stage and the following variables were explored: audience, impact of the WHI study, innovation attributes, the projected tone of the article, and themes evident in the sample.

4.1.5.1 Confirmation and Audience

Consumer publications contributed 45.7% (n = 16) of the confirmation stage articles; medical publications contributed 54.3% (n = 19). While a larger proportion of implementation stage articles were found in medical vs. consumer publications, the release of information about the early termination of the estrogen plus progestin trial within the WHI occurred in both medical and consumer publications. It is, therefore, not surprising that the process of dealing with the resulting dissonance occurred in both types of publications and involved both patient and prescribing adopters. During the implementation stage, a noteworthy amount of dissent and dissonance was evident in the medical literature, but it was not communicated in the consumer literature; with the release of WHI results, consumer publications brought the debate into the public eye and moved this I-D process firmly into the confirmation stage.

4.1.5.2 Confirmation and Impact

Confirmation stage articles were impacted by WHI findings proportionally more than expected; the relationship between confirmation stage and WHI impact was thus statistically significant ($\chi^2 = 20.417$, df = 1). The WHI results directly impacted 71.4% (n = 25) of confirmation stage articles; whereas, the WHI did not impact any of the non-confirmation stage articles. This suggests that the communication of information into medical and consumer publications can dramatically alter the path of a widely accepted innovation.

Diffusion studies in the field of nursing suggest, "the average time from conception to realization of an innovation is 20 years" (Dooks 2001, 99), and 13 years after the discovery that ulcer disease was related to a bacterial infection (Marshall 2002), only 27% of consumers believed that the cause of ulcers might be bacterial, while 60% still believed that ulcers were caused by stress and 17% believed that they were caused by spicy food (Novelli 1997). This contrasts with women's knowledge of the dissonance caused by the WHI and the impact on user behaviour: one month after the release of WHI findings in the medical and consumer literature, an American survey found that 64% of respondents had heard of the WHI study and 13% had stopped taking HT as a result (Breslau et al. 2003). Six months later, 58% of respondents to a survey conducted in New Zealand had stopped taking HT as a result of information related to WHI results (Lawton et al. 2003).

4.1.5.3 Confirmation and Innovation Attributes

A higher than expected proportion of the confirmation stage articles noted that HT does not have relative advantage for adopters (83.3%, n = 20) and a higher than expected proportion of non-confirmation stage articles promoted the view that HT does have relative advantage for adopters (66.7%, n = 8). The relationship between confirmation stage and the innovation attribute, relative advantage, was thus significant ($\chi^2 = 9.0$, df = 1, $p < .005$). The majority of confirmation articles did not present the innovation attributes of long-term preventative HT in a positive light. While 66.7% (n = 16) of those addressing compatibility presented the view that HT is not compatible with the beliefs, values or needs of adopters, only 11.1% (n = 1) of the non-confirmation stage presented this perspective. Within the group of confirmation articles discussing trialability, 66.2% (n = 2) suggested that HT is not easily trialable on a limited basis; none of the non-confirmation articles in this category presented this perspective. The view that the positive benefit of HT is not observable was projected by 78.9% (n = 15) of confirmation stage articles discussing observability; only 44.4 % (n = 4) of non-confirmation stage articles presented this point of view. Interestingly, the majority of both confirmation stage (86.2%, n = 25) and non-confirmation stage (71.4%, n = 5) articles addressing innovation complexity presented information that increased the perceived complexity of HT.

Literature related to the diffusion of innovations establishes that presentation of innovation attributes has a critical influence on innovation adoption (Rogers 1995; Landrum 1998a; Meyer, Johnson, and Ethington 1997) and that marketing of a given innovation can be facilitated by seeking to enhance those attributes that adopters will value (Landrum 1998b). Results demonstrate that innovation attributes may also play a role in the re-evaluation and potential rejection of an innovation following initial adoption. Articles demonstrating that HT does not possess positive attributes dominate the confirmation stage articles, thus throwing into question previously made positive adoption decisions.

4.1.5.4 Confirmation and Projected Tone

The relationship between confirmation stage articles and projected tone was significant, since confirmation stage articles were proportionally more likely to express an overall negative or cautious view of HT as a long-term preventative treatment for menopausal or postmenopausal women ($\chi^2 = 8.791$, df = 1). These results suggest that dissonance introduced after the adoption of HT influenced the tone of medical and consumer publications towards this innovation and, because people are influenced by what they read (Clinkingbeard et al. 1999; Griffiths 1999), this altered tone may influence the attitudes of adopters.

4.1.5.5 Confirmation and Major Themes

'Scientific information' was the most common theme in confirmation stage articles and this group of articles also demonstrated greater focus on the role of HT in prevention and on the dissonance created by WHI findings (see table 2). A significant relationship was found between confirmation stage articles and the theme 'dissonance after WHI' ($\chi^2 = 10.413$, df = 1, $p < .001$). Although 'HT as prevention' was also a dominant theme during the early I-D stage articles, attention to this theme during the confirmation stage did not promote HT for prevention; rather confirmation articles focused on exploring the legitimacy of the association between long-term HT and disease prevention. Given the importance of applying high quality research in clinical practice (Haines and Donald 1998), it is gratifying to note that dissonance following the release of WHI findings resulted in a high proportion of articles that focused on scientific information.

Table 2. Thematic focus of confirmation stage articles

Theme	Percentage of Articles Discussing Theme
Scientific information	71.4% (n = 25)
HT as prevention	48.6% (n = 17)
Dissonance following WHI	48.6% (n = 17) *
Symptom relief	25.7% (n = 9)
HT as risk	22.9% (n = 8)
HT alternatives	17.1% (n = 6)
Dissent prior to WHI	14.3% (n = 5)
Other themes	5.7% (n = 2)
Health promotion	2.9% (n = 1)

* Statistically significant relationship

Even though 'HT alternatives' represented only a small proportion of these articles, it is noteworthy that, for the first time in the I-D process, articles in the sample addressed this theme. Qualitative studies demonstrate that women are concerned about the long-term implications of HT and are interested in learning about HT alternatives (Hunter, O'Dea, and Britten 1997; Stephens, Budge, and Carryer 2002; Winterich and Umberson 1999). Perhaps, as suggested by Yusuf and Anand (2002), one of the lessons from the WHI is that doctors should be prepared to discuss alternative therapies with women.

This exploratory study found a paucity of articles focusing on health promotion throughout the I-D stages. This finding warrants serious attention. Cousins and Edwards (2002), for example, note that "adequate levels of physical activity is a certain and safe way to prevent [osteoporosis]" and even that "moderate to vigorous activities, including walking, have maintained or remineralized bone by about 2% over a year without calcium supplementation" (335). Not only do factors such as diet, exercise and cigarette smoking have profound influence on the experience of health and disease (Worcester and Whatley 1992), but it should also be noted that health promotion makes eminent economic sense in a society with an aging population.

4.1.5.6 Conclusion: Confirmation Stage Articles

Confirmation stage articles were impacted by WHI findings proportionally more than expected and, although medical publications contributed a small majority of the articles in this group, the process of dealing with post-WHI dissonance occurred in both medical and consumer publications. As a result, the implications of long-term HT were brought into both the public eye and, through a noteworthy number of articles in peer review publications, into the eye of medical practitioners. Innovation attributes were presented in a primarily negative light and an overall negative or cautious view of long-term HT was expressed; consequently, confirmation stage articles were likely to have played a role in innovation re-evaluation and possibly discontinuance. 'Scientific information' was the most common theme for confirmation articles, but articles also focused on 'HT as prevention' and 'dissonance following WHI.' Despite the scarcity of articles with a thematic focus on 'health promotion,' for the first time in the I-D process, a small minority of articles thematically focused on 'HT alternatives.'

Confirmation stage articles demonstrated that the WHI has influenced the information presented in medical and consumer publications and that these publications, by repeating, discussing, moulding and building on that information, can influence the views of consumers and physicians.

4.1.6 Confirmation Stage Articles: Avoids Dissonance

The early release of WHI findings in July 2002 created profound dissonance for women and physicians who had, in good faith, adopted this medical innovation. Articles published following the release of this study functioned in a variety of different ways. Rogers (1995) points out that dissonance is an "uncomfortable state of mind that the individual seeks to reduce or eliminate" (181). He also notes that people choose different ways of dealing with dissonance. Within the confirmation stage articles identified in this exploratory study, 28.6% (n = 10) provided information that facilitated the reader who would wish to avoid the dissonance (AD) created by the WHI. These articles tended to discuss study limitations and/or limited application of results. A detailed analysis and discussion of AD articles is helpful in exploring the impact of the WHI on published literature and the role of the literature in dealing with the dissonance created by the WHI.

In order to explore the first research question, relationships between confirmation stage articles that function to avoid dissonance and the following variables were explored: audience, innovation attributes, the projected tone of the article, and major themes.

4.1.6.1 Avoids Dissonance and Audience

An equal number of AD articles were found in medical and consumer publications (50%, n = 5), whereas a higher proportion of non-AD confirmation stage articles was found in medical publications (56%, n = 14) vs. consumer publications (44%, n = 11). These findings were not statistically significant, which indicates that given the number of AD articles, one would expect them to be divided equally between audience groups. Despite different attitudes towards menopause and HT use between these two adopter groups (Hunter, O'Dea, and Britten 1997; Hvas 2001), these results suggest that the published literature, which focused on the limitations of the WHI study, presented an equally mollifying perspective to physicians and women.

4.1.6.2 Avoids Dissonance and Innovation Attributes

Articles that facilitated post-WHI dissonance avoidance resembled articles from the earlier I-D stages in that they presented the innovation attributes of long-term HT in a positive light. While 57% (n = 4) promoted or highlighted the relative advantage of HT, 100% (n = 17) of non-AD confirmation stage articles portrayed HT as lacking relative advantage for adopters. Long-term preventative HT was presented as compatible with the beliefs, values or needs of adopters by 71.4% (n = 5) of AD articles; however, 82.4% (n = 14) of non-AD confirmation stage articles demonstrated that long-term HT is not compatible for prescribers or users. Although only 25% (n = 2) of AD articles facilitated adoption by decreasing this therapy's perceived complexity or clarifying its use and 75% (n = 6) presented information that increased perceived complexity, the vast majority of non-AD confirmation articles presented information indicating that HT therapy is more complex than simple (90.5%, n = 19). Few AD articles (n = 4) addressed whether the results of long-term HT are observable and these are equally divided between those promoting and those opposing the observability of HT benefit. Non-AD confirmation articles, on the other hand, clearly threw into question the positive benefit derived from long-term HT: 86.7% (n = 13) demonstrated that positive benefit is not observable. These results suggest that confirmation stage articles, which facilitate individuals wishing to avoid dissonance, discuss innovation attributes in a way that is consistent with information presented in the early I-D stages.

4.1.6.3 Avoids Dissonance and Projected Tone

Despite presenting AD information, these articles projected an ambiguous view of HT: 50% (n = 5) projected a neutral tone; 30% (n = 3) projected an overall positive tone; and 20% (n = 2) projected an overall negative or cautious view of long-term preventative HT. This contrasts with non-AD articles: only 44% (n = 11) presented a neutral tone, 4% (n = 1) presented a positive tone, and 52% (n = 13) projected a negative or cautious view of HT. These findings suggest that despite attempts in some publications to speak to those users who might wish to avoid dissonance related to HT adoption, the WHI study has impacted the literature in an indisputable way.

Rogers (1995) points out that "individuals frequently try to avoid becoming dissonant by seeking only that information that they expect will support or confirm the decision they already made" (181). He goes on to comment that despite selective exposure to information, in some cases information will reach adopters and lead to questioning the original adoption decision. With the extensive coverage of the WHI study it has become difficult for prescribing doctors and women to totally avoid re-evaluating the use of HT. Some articles present a clear perspective on long-term HT, "with the release of the WHI findings, the evidence is now unequivocal" (Day 2002, 361); however, even for those articles presenting a dissonance avoiding perspective, endorsement of this therapy has become much more difficult.

4.1.6.4 Avoids Dissonance and Major Themes

As demonstrated earlier, 'scientific information' was a prominent theme in the confirmation stage (see table 3). Despite the fact that there were no research style AD articles, 70% (n = 7) of the AD articles focused on scientific information. As might be expected, 'dissonance following WHI' was also a prominent theme (70%, n = 7). A statistically significant relationship was found between AD articles and the theme 'symptom relief' ($\chi^2 = 4.323$, df = 1); AD articles were more likely to thematically address 'symptom relief,' whereas non-AD articles were less likely to address this theme. This indicates that articles attempting to avoid dissonance are focusing to a greater degree than other confirmation articles on the short-term use of HT for symptom relief, a practice that is thought of be safe and has established efficacy. This does, however, represent an evasion of the facts arising from the WHI, since its focus was the safety and efficacy of long-term preventative HT.

Table 3. Thematic focus of confirmation stage articles avoiding dissonance

Theme	Percentage of Articles Discussing Theme
Scientific information	70% (n = 7)
Dissonance following WHI	70% (n = 7)
HT as prevention	50% (n = 50)
Symptom relief	50% (n = 50) *
HT as risk'	20% (n = 2)
Dissent prior to WHI	20% (n = 2)
HT alternatives	10% (n = 1)
Other themes	0
Health promotion	0

* Statistically significant relationship

4.1.7 Confirmation Stage Articles: Stimulates Re-evaluation

Eighty percent (n = 28) of the articles identified as having features related to the I-D confirmation stage provided information that stimulated or discussed re-evaluation of HT for long-term prevention of disease. Rogers (1995) points out that "at the confirmation stage, the individual seeks to avoid a state of dissonance or to reduce it if it occurs" (181). One way that dissonance may be reduced is through exploring the information that introduced dissonance and re-assessing the basis for the original adoption decision. The large proportion of confirmation stage articles dealing with the re-evaluation of HT demonstrated the critical role that published literature played in dealing with dissonance resulting from the WHI study.

In order to explore the influence of the WHI and the role of the literature in the I-D process, relationships between articles that function to stimulate re-evaluation and the following variables were explored: audience, innovation attributes, the projected tone of the article, and major themes.

4.1.7.1 Stimulates Re-evaluation and Audience

Articles stimulating re-evaluation were published primarily in medical publications (57.1%, n = 16), but a noteworthy proportion was also found in publications read by consumers (42.9%, n = 12). These results suggest that, unlike many medical innovations that are debated far from the public eye and then slowly diffuse to the physician and, eventually, patient populations (Centers for Disease Control and Prevention 2001), the publication of WHI results in both the lay and medical press impacted the I-D process by presenting dissonance to both consuming and prescribing adopters. While physicians struggled to determine appropriate clinical response to WHI findings (Blake et al. 2002; Reid 2002), women were also given the opportunity to re-evaluate their own health care. A survey assessing women's knowledge of HT and attitudes in the wake of the WHI study, for example, found that one month following the study, 80% of the women stated that they would like more information. This random sample of articles suggests that women were being provided with at least some information within the consumer literature, and that this contributed to their re-evaluation of long-term HT.

4.1.7.2 Stimulates Re-evaluation and Innovation Attributes

Confirmation stage articles stimulating re-evaluation of long-term preventative HT presented to readers the negative attributes of this therapy: 94.7% (n = 18) indicated that HT does not have relative advantage over other options or non-treatment; 80% (n = 16) point out that HT is not compatible with adopters' beliefs, values or needs; 91.7% (n = 22) presented information that increased the reader's perception of this therapy's complexity; 93.8% (n = 15) demonstrated that positive benefit is not observable; and none of the articles communicated that the therapy is easily triable on a limited basis.

These results indicate a departure from much of the pre-WHI medical and consumer articles, which both subtly and directly promoted the positive attributes of preventative HT. A 1995 *Time* magazine cover, for example, under the headline 'Estrogen: Every Woman's Dilemma' featured two hands, an old and wrinkled hand and one that was not (Kaufert and Lock 1997). This subtle image unmistakably and eloquently expressed the observability and potential relative advantage of HT, as well as giving an impression of simplicity. A further example is provided by a medical article in the publication, *Maturitas*, which was introduced with a clear statement of HT's relative advantage and the presumption of compatibility: "hormone replacement therapy has many important benefits and overall seems to increase life expectancy" (Christiansen 2001, S1). Content analysis of articles stimulating re-evaluation of long-term HT suggests a dramatic departure from the presentation of innovation attributes in these pre-WHI presentations. Since perceived attributes profoundly impact innovation adoption and discontinuance (Rogers 1995), it is clear that the published literature, through the presentation of innovation attributes, impacts the I-D process.

4.1.7.3 Stimulates Re-evaluation and Projected Tone

Although this group of articles predominantly presented the negative attributes of long-term HT, articles were almost evenly split between those presenting an overall neutral tone towards HT (46.4%, n = 13) and those expressing an overall negative or cautious view (50%, n =14). One article (3.6%) expressed an overall positive view of HT as preventative therapy. These results suggest that despite the re-evaluation stimulated by the WHI's dramatic findings and the evidence that HT does not possess the overwhelmingly positive attributes assigned to it, there is still a degree of ambiguity about the application of new information and appropriate use of HT.

4.1.7.4 Stimulates Re-evaluation and Major Themes

While 'scientific information,' 'dissonance following WHI,' and 'HT as prevention' were major themes of confirmation stage articles stimulating re-evaluation, 'symptom relief' became less of a focus as articles presented evaluative information about long-term HT (see table 4). The relative low ranking of 'HT as risk' (25%, n = 7) re-enforced previous discussion related to the ambiguous tone presented by these articles as a group. For adopters who, after reading this material and re-evaluating innovation adoption, are considering discontinuation, few options are offered: only 14.3% (n = 4) of these articles focus on 'HT alternatives' and only 3.6% (n = 1) focus on health promotion.

Table 4. Thematic focus of confirmation stage articles stimulating re-evaluation

Theme	Percentage of Articles Discussing Theme
Scientific information	78.6% (n = 22)
Dissonance following WHI	53.6% (n = 15)
HT as prevention	53.6% (n = 15)
HT as risk'	25.0% (n = 7)
Symptom relief	21.4% (n = 6)
HT alternatives	14.3% (n = 4)
Dissent prior to WHI	7.1% (n = 2)
Other themes	7.1% (n = 2)
Health promotion	3.6% (n = 1)

4.1.8 Confirmation Stage Articles: Discusses Discontinuance

Only 22.9% (n = 8) of the articles identified as having features related to the I-D confirmation stage discussed discontinuance of long-term preventative HT. This proportion of articles discussing discontinuance may indicate the degree to which long-term HT had been "routinized into the ongoing practice and way of life of the adopter" (Rogers 1995, 183). There had been, however, a considerable emphasis in the medical literature on promoting HT continuance (Kaplan et al. 2002; Pitkin 2002; Thompson 1995); therefore, even this proportion of articles discussing discontinuance represents a noteworthy change in the information being presented to readers.

In order to explore the first research question, relationships between confirmation stage articles that discuss discontinuance and the following variables were explored: audience, innovation attributes, the projected tone of the article, and major themes.

4.1.8.1 Discusses Discontinuance and Audience

A greater proportion of confirmation stage consumer articles (75%, n = 6) discussed discontinuance of long-term preventative HT than did confirmation stage medical articles (25%, n = 2). These results may well reflect that for many women, the primary reason for using HT in the first place related to the treatment of symptoms rather than long-term disease prevention (Hemminki and Topo 1997). Furthermore, even prior to the early release of WHI findings, women expressed apprehension about the long-term implications of HT (Hunter, O'Dea, and Britten 1997; Stephens, Budge, and Carryer 2002; Winterich and Umberson 1999); as a result, it is likely that discussion of discontinuance would find a receptive audience in the consumer population.

Rogers (1995) notes that there are two types of discontinuance, *replacement discontinuance* and *disenchantment discontinuance*. While women may experience disenchantment with long-term HT and reject it "because the innovation is inappropriate for the individual and does not result in an adequate level of perceived relative advantage" (192-3), physicians, who must deal with patients, are more likely to feel comfortable with innovation rejection when a superior replacement innovation is available for adoption. Despite the dissonance produced by the WHI and the uncertainty still surrounding appropriate HT use, neither prescribing doctors nor users have been presented with a replacement innovation.

4.1.8.2 Discusses Discontinuance and Innovation Attributes

All of the articles discussing discontinuance highlighted negative innovation attributes related to long-term preventative HT: HT was portrayed as not having relative advantage (100%, n = 6), it was not compatible with beliefs, values or needs of adopters (100%, n = 6), it was portrayed as being complex rather than simple (100%, n = 8), and it was presented as not being easily trialable (100%, n = 1). One article (20%) notes the observability of positive HT results, but 4 (80%) note that positive benefit is not observable. As with confirmation articles stimulating re-evaluation, assessment of innovation attributes presented in this group of articles suggests a marked change in the way HT is presented to prescribers and users. For doctors, the relative advantage of HT had been effectively marketed: "the need to prescribe hormones has crept into the diagnosis of symptoms so thoroughly that refraining from prescribing HRT seems to necessitate specific justification" (Palmlund 1997a, 160). For women patients, the benefits of HT had been promoted by popular magazines, consumer health publications and personal physicians (Seaman 2003). Rogers (1995) proposes, "the perceived attributes of innovations . . . are negatively related to the rate of discontinuance . . . we would expect an innovation with a low relative advantage to have a slow rate of adoption and a fast rate of discontinuance" (183-4). Medical and consumer publications, which present negative views of innovation attributes during the confirmation stage, will, therefore, have an impact on adopter attitude and hence on the I-D process.

4.1.8.3 Discusses Discontinuance and Projected Tone

Confirmation articles discussing discontinuance primarily expressed a negative or cautious view of long-term HT (62.5%, n = 5), while a little more than one third of the sample presented a neutral view of HT (37.5%, n = 3). Among other confirmation articles, 37% (n = 10) had a negative or cautious tone while 48.1% (n = 13) expressed a neutral view and 14.8% (n = 4) projected a positive view of HT. The finding that articles discussing discontinuance express a negative tone proportionately more than other confirmation stage articles is not surprising as these articles are actually addressing the issue of action following dissonance.

4.1.8.4 Discusses Discontinuance and Major Themes

As with confirmation stage articles in general, 'scientific information,' 'dissonance following WHI,' and 'HT as prevention' were primary themes in this group of articles. 'Symptom relief' remained an important theme, while 'HT alternatives' and 'health promotion' receive minimal and no attention respectively (see table 5). 'HT as risk' assumed less importance within confirmation stage articles discussing discontinuance, perhaps because risk was assumed. For those readers who chose to discontinue HT, these articles provided little information beyond the discussion of discontinuance. The lack of information about alternatives and health promotion reflects a general paucity of information on these topics. A compilation of three qualitative studies exploring women's health-related decision-making over the life cycle, for example, found that many women expressed frustration and disappointment with doctors' disinterest and/or skepticism about alternative therapies and the "medical community's failure to provide a balanced perspective" (Brown et al. 2002, 228).

4.1.9 Confirmation Stage Articles: Varied HT Use

Among confirmation stage articles, 40% (n = 14) dealt with the dissonance introduced by the WHI by suggesting or discussing varied use of HT. While articles proposing varied HT use were also apparent during the implementation stage, as physicians considered ways of increasing HT compliance (Christiansen 2001; Kenemans et al. 2001; Genazzani and Gambacciani 2001), these articles featured discussions of different delivery routes or doses. Confirmation stage articles suggesting varied HT use, however, primarily discussed limited utilization and a focus on HT use for symptom relief.

Table 5. Thematic focus of confirmation stage articles discussing discontinuance

Theme	Percentage of Articles Discussing Theme
Scientific information	87.5% (n = 7)
Dissonance following WHI	87.5% (n = 7)
HT as prevention	75% (n = 6)
Symptom relief	37.5% (n = 3)
HT as risk'	12.5% (n = 1)
HT alternatives	12.5% (n = 1)
Dissent prior to WHI	0
Other themes	0
Health promotion	0

In order to explore the impact of the WHI and the role of published literature, relationships between articles discussing varied HT use and the following variables were explored: audience, innovation attributes, the projected tone of the article, and major themes.

4.1.9.1 Varied HT Use and Audience

A greater proportion of confirmation stage articles discussing varied HT use were found in medical publications (57.1%, n = 8) than in consumer publications (42.9%, n = 6). These results suggest that knowledge of variable HT use in light of WHI findings may be of more critical importance to physicians than individual women. While individuals are responsible for only their own decision-making, physicians bear some of the responsibility for the decision-making of patients. A telephone survey of 1082 randomly selected women found that doctors were the major source of information when women were making the decision to use HT (Newton et al. 1998).

Results from a qualitative study exploring women's decision-making related to HT reinforce the importance of physician knowledge about treatment options: "the patient-doctor relationship was critical . . . for receiving and discussing new medical knowledge" (Marmoreo et al. 1998, 292). Knowledge of treatment options would clearly be of paramount importance in the post-WHI environment and, since HT has shaped the way menopause and the postmenopause is perceived by women (Topo and Hemminki 1995), treatment options that focus on varied use may fit more easily into the prevailing, biomedical paradigm than a Kuhnian re-evaluation of the medical management of women's health.

4.1.9.2 Varied HT Use and Innovation Attributes

Confirmation stage articles discussing varied HT use demonstrate low support for the perceived innovation attributes of long-term preventative HT: 11.1% (n = 1) support the relative advantage of long-term HT, while 88.8% (n = 8) communicate that this therapy does not have relative advantage; 36.4% (n = 4) maintain that this form of HT is compatible with adopters' beliefs, values and/or needs, and 63.6% (n = 7) present the opposing perspective; 28.6% (n = 2) claim that positive results of this therapy are observable, whereas 71.4% (n = 5) demonstrate that positive benefit is not observable. All of the confirmation articles discussing varied use of HT and addressing 'complexity' (n = 12) communicated the view that HT is more complex than simple. The two articles addressing trialability were equally divided as to the trialability of this innovation.

Since perception of an innovation's attributes impacts adoption and discontinuance (Rogers 1995), these findings suggest that confirmation articles discussing varied HT use will not facilitate adoption of long-term preventative HT but may hasten discontinuance for those who have already adopted this use of HT. It is interesting to note that support of innovation attributes is proportionately slightly higher among these articles when compared to confirmation articles stimulating re-assessment or discussing discontinuance. This suggests that articles discussing variant use of HT tended to be less condemning of long-term HT use.

4.1.9.3 Varied HT Use and Projected Tone

Confirmation articles discussing varied HT use were proportionately more neutral than other confirmation stage articles: 57.1% (n = 8) projected a neutral tone whereas 38.1% (n = 8) of all other confirmation articles presented an overall neutral view of long-term HT. Those articles projecting a negative or cautious view were proportionately equal: 42.9% (n = 6) of articles discussing varied use of HT and 42.9% (n = 9) of all other confirmation articles projected a negative tone. There were no confirmation articles discussing varied HT use that projected a positive tone.

These results reinforce observations made previously: articles discussing variant use of HT tend to be less negative about long-term HT use. The larger proportion of articles projecting a neutral tone suggests a more ambiguous attitude towards long-term HT among this group of articles.

4.1.9.4 Varied HT Use and Major Themes

Major themes in confirmation stage articles discussing varied use of HT are outlined in table 6. Once again, 'scientific information,' 'dissonance following WHI,' and 'HT as prevention' were dominant themes. A significant relationship ($p < .005$) was found between articles discussing varied HT use and 'dissonance following WHI' ($\chi^2 = 8.407$, df = 1); a proportionately greater number of varied HT use articles thematically focused on this theme than would be expected. This is not surprising, as long-term preventative HT had become so entrenched that it was the post-WHI environment that stimulated exploration of varied HT use. There was also a proportionately greater than expected focus on 'HT as prevention' and this relationship was found to be significant ($\chi^2 = 4.880$, df = 1). This suggests that articles discussing varied use of HT are also more likely to discuss the previous use of HT as a long-term preventative therapy.

'Symptom relief' became a proportionately more prominent theme in this group of articles than it had been in those confirmation articles stimulating re-evaluation or discussing discontinuance. This finding indicates the focus of varied HT use in the post-WHI world: "to date, HT is the most effective treatment for the relief of vasomotor symptoms . . . take HT for the shortest possible time that works . . . [and] in the smallest effective dose" (American College of Obstetricians and Gynecologists 2002). It is interesting that while the American College of Obstetricians and Gynecologists notes "some women may choose to manage their symptoms without any use of HT, either through lifestyle changes alone or with other therapies" (American College of Obstetricians and Gynecologists 2002), articles discussing varied HT use appear to provide little information about other options such as 'HT alternatives' or 'health promotion.'

Table 6. Thematic focus of confirmation stage articles discussing varied HT use

Theme	Percentage of Articles Discussion Theme
Scientific information	78.6% (n = 11)
Dissonance following WHI	78.6% (n = 11) *
HT as prevention	71.4% (n = 10) *
Symptom relief	42.9% (n = 6)
Dissent prior to WHI	21.4% (n =3)
HT as risk'	7.1% (n = 1)
HT alternatives	7.1% (n = 1)
Other themes	7.1% (n = 1)
Health promotion	7.1% (n = 1)

* Statistically significant relationship

4.1.10 Confirmation Stage Articles: HT Alternatives

Among articles having features related to the I-D confirmation stage, 25.7% (n = 9) suggested or discussed HT alternatives for menopausal or postmenopausal women as well as for physicians providing care for this population. Although people frequently think exclusively of complementary or alternative medicine when considering HT alternatives, it is important to point out that HT alternatives include the primary prevention of disease through dietary and lifestyle change. Seaman (2003), for example, points out to her readers the important role of vitamin D in maintaining bone health and its traditional source, sunlight.

In order to explore the influence of the WHI and the role of the literature in the I-D process, relationships between articles that discuss alternatives to HT and the following variables were explored: audience, innovation attributes, the projected tone of the article, and major themes.

4.1.10.1 HT Alternatives and Audience

Confirmation stage articles discussing HT alternatives were found predominantly in consumer publications (88.9%, n = 8) and minimally in medical publications (11.1%, n = 1). These results suggest that discussion of HT alternatives is more readily available to women than to prescribing physicians. Well before WHI results were released, qualitative studies demonstrated that "there was a general preference not to take medication" among middle-aged women and that "the development of alternative treatment strategies might be welcomed" by this population (Hunter, O'Dea, and Britten 1997, 1541, 1547). Participants in Winterich and Umberson's (1999) qualitative study, which explored the impact of social context on women's menopausal experiences, reported that the medical establishment had a "narrow approach" (65) to menopause. Furthermore, the authors noted that, by limiting the information provided, the physician may shape the context within which postmenopausal health is perceived. Although the WHI has clearly impacted recommendations about HT use (American College of Obstetricians and Gynecologists 2002; Society of Obstetricians and Gynaecologists of Canada n.d.), there still appears to be limited information available about alternatives and the majority of it is appearing in consumer rather than medical publications.

4.1.10.2 HT Alternatives and Innovation Attributes

Confirmation stage articles which suggest or discuss HT alternatives presented a negative view of preventative HT's innovation attributes: 100% (n = 7) communicated that this therapy does not have relative advantage for adopters; 66.7% (n = 4) indicated that it is not compatible with adopters' beliefs, values, or needs; 80% (n = 4) demonstrated that it is more complex than simple; and 75% (n = 3) indicated that positive benefit from this therapy is not observable. Two articles discussed trialability; one presented the view that long-term HT can be tried easily without full commitment to adoption, whereas the other opposed this perspective. Because the perceived attributes of innovations following adoption impact discontinuance decisions, these results suggest that confirmation articles discussing HT alternatives may facilitate discontinuance of long-term preventative HT.

4.1.10.3 HT Alternatives and Projected Tone

Although this group of confirmation articles suggested or discussed HT alternatives that might be useful to menopausal or postmenopausal women, their projected tone regarding long-term HT remained ambivalent: 44.4% (n = 4) expressed an overall negative or cautious view; 44.4% (n = 4) expressed a neutral view; and 11.1% (n = 1) projected an overall positive view. These results may be an expression of the ambivalence expressed by women regarding choice of treatment during the menopausal and postmenopausal years: "women may be critical of doctors but accept their advice; women may question the possibility of predicting future ill health yet appear to make a decision based on the results of a medical test that tries to predict" (Griffiths 1999, 479).

4.1.10.4 HT Alternatives and Major Themes

Major themes presented in confirmation stage articles that suggested or discussed HT alternatives are outlined in table 7. It is interesting to note that only two thirds (66.7%, n = 6) of this selected subgroup present 'HT alternatives' as a major theme and less than half (44.4%, n = 4) present 'scientific information' as a major theme. These findings reinforce the problems facing long-term HT adopters as they deal with the dissonance introduced by the WHI. Rogers (1995) points out that in many fields "there are constant waves of innovation" (182) with new ideas replacing existing practices that once were innovations. This replacement discontinuance occurs with regularity in the health sciences; the adoption of tetracycline treatment, for example, superseded previous antibiotic treatment (Coleman, Katz, and Menzel 1966). The dilemma facing those who prescribed and used long-term preventative HT is that within the prevailing paradigm, where "pharmaceuticals are the tools of everyday [medical] practice" (Topo, Hemminki, and Uutela 1993, 107) and women have come to accept the construction of menopause as risk (Palmlund 1997b), there is little to replace HT. Results suggest that even within articles discussing alternatives to HT, information is limited and new scientific knowledge is scarce.

Table 7. Thematic focus of confirmation stage articles discussing HT alternatives

Theme	Percentage of Articles Discussing Theme
HT alternatives	66.7% (n = 6)
Scientific information	44.4% (n = 4)
Symptom relief	33.3% (n = 3)
HT as prevention	22.2% (n = 2)
Dissent prior to WHI	22.2% (n = 2)
HT as risk	22.2% (n = 2)
Dissonance following WHI	11.1% (n = 1)
Other themes	0
Health promotion	0

4.1.11 Research Question 1: Summary of Results and Discussion

Content analysis was used to investigate the following: the impact of the WHI study on a random sample of medical and consumer articles published between 1999 and October 2003, and the role played by the literature in the I-D process of long-term preventative HT. In order to explore these issues, articles were analyzed to determine their functional characteristics and were then matched to the activities occurring in corresponding I-D stage. Confirmation stage articles were further divided into categories according to their functional characteristics.

Primarily targeting the consumer audience, KA articles focused on the positive attributes of long-term preventative HT and expressed an overall positive view of this therapy. WHI results did not influence these results as they were published prior to July 2002. Despite the lack of articles with thematic focus on 'scientific information,' this group of articles played a role in the I-D process by providing readers with knowledge of HT, which may contribute to an adoption decision. Given the many questions about implementation that arose in the literature following adoption, however, these results suggest that KA articles within this random sample may have presented selective material that focused on stimulating adoption as opposed to providing knowledge that might allow the reader to consider a decision to adopt or reject this therapy.

Persuasion stage articles represented a small portion of the random sample and were published in the pre-WHI time period. Found predominantly in consumer publications, results suggest that consumers may be later adopters of this innovation than physicians. Persuasion articles fostered a positive perception of innovation attributes and primarily focused on the themes 'HT as preventative therapy' and 'HT as symptom relief.' Prominence of *symptom* presentation was a feature of persuasion stage articles in the random sample. Focusing on positive innovation attributes and advantages of adoption, these articles played a role in the I-D process of this innovation by presenting information in a manner that might potentially move readers beyond the accumulation of knowledge to a perception of personal applicability and a positive feeling towards long-term HT.

The very few articles expressing characteristics of the decision stage appeared in pre-WHI, consumer publications and focused positively on innovation attributes. Findings suggest that readers of consumer publications may be later adopters of long-term HT and that articles promoting an adoption decision focused on symptoms or the threat of disease. These articles fostered a positive view of long-term preventative HT and focused on stimulating adoption.

Almost half of the articles in the random sample had characteristics of the implementation stage and a higher than expected proportion of these articles was published pre-WHI, in medical publications, and particularly in peer-reviewed literature. Articles in the implementation stage presented innovation attributes ambiguously, a noteworthy departure from the positive presentation of attributes evident in the earlier I-D stages, and proportionally fewer articles than expected focused thematically on 'symptom relief.' A higher than expected proportion of implementation articles focused thematically on 'HT as risk,' and 'scientific information' became a more important theme than it had been at earlier I-D stages. These results point out that despite the adoption of HT as an appropriate and commonly recommended long-term preventative treatment for menopausal and post-menopausal women, the literature expressed a striking degree of uncertainty about the expected consequences of this innovation even before the release of WHI results. Although the WHI played a key role in bringing the debate about long-term HT into the eye of average patient and physician users, content analysis demonstrated that the published literature played a fundamental role elucidating post-adoption questions and moving this innovation towards the re-evaluation that occurred following the release of WHI results.

Medical publications contributed a small majority of confirmation stage articles, however all confirmation articles were impacted by WHI findings proportionally more than expected. As a result, the process of dealing with post-WHI dissonance occurred in both medical and consumer publications and the implications of long-term HT were brought both to the attention of the public and, through a noteworthy number of articles in peer reviewed publications, to the attention of medical practitioners. Since the majority of articles presented innovation attributes in a negative light and expressed an overall negative or cautious view of long-term HT. these articles are likely to have played a role in innovation re-evaluation and possibly discontinuance. Confirmation articles were less likely to present the assumption that menopause is associated with undesirable *symptoms*; they were more likely to portray HT as a risk factor in cardiac disease; and they were more likely to discuss breast cancer. The most common theme for confirmation articles was 'scientific information' but articles also focused on 'HT as prevention' and 'dissonance following WHI.' Despite the on-going paucity of 'health promotion' oriented articles, for the first time in the I-D process a small minority of articles thematically focused on 'HT alternatives.' Confirmation stage articles demonstrated that the WHI has influenced the information presented in medical and consumer publications and that these publications, by repeating, discussing, moulding and building on that information, have had an important influence on the views of consumers and physicians.

While the majority of confirmation stage articles stimulated re-evaluation of this therapy, articles in this stage also functioned to explore varied HT use, avoid dissonance, discuss alternatives to long-term HT, and discuss discontinuance. A slightly higher proportion of articles stimulating re-evaluation were published in medical publications. Despite bringing negative attributes of this therapy to readers' attention, these articles were divided between expressing an overall neutral and overall negative view of long-term HT. Articles exploring varied HT use were also slightly more evident in medical publications. Although presenting innovation attributes in a more negative than positive light, confirmation articles exploring varied HT use tended to be less negative about long-term HT use than other confirmation stage articles. About a quarter of confirmation stage articles presented information that might allow the reader to avoid the dissonance created by the WHI. These articles were found equally in medical and consumer publications and, although they projected an overall ambivalent tone, they resembled early I-D stage articles in that they presented innovation attributes in a positive way. Articles in this group were more likely to thematically address 'symptom relief' than other confirmation stage articles.

Articles discussing HT alternatives were found primarily in consumer publications and minimally in medical publications; their tone towards long-term HT was ambivalent despite presenting the negative attributes of this therapy. Thematic analysis demonstrated that even within this group of articles new scientific information was limited. Actual discussion of discontinuance occurred in the smallest proportion of confirmation articles, was primarily in consumer publications, and two thirds of these articles expressed a negative view of long-term HT. Despite directly addressing discontinuance, these articles provided little information about alternatives.

Although this exploratory study does not address information use, the published literature gives clear evidence of major influences on innovation, in particular, the influence of the WHI on the diffusion of HT as a long-term preventative therapy. Content analysis demonstrated that articles have distinct qualities that may impact the I-D process through the presentation of new information, discussion of existing information and the shaping of information.

4.2 RESEARCH QUESTION 2: RESULTS AND DISCUSSION

Research question 2: Given that published literature provides a conduit through which information flows within and between networks, what role did varying tie strength and the presence of 'weak trusted ties' play in the I-D process?

Although much of the preceding discussion has focused on the role of published literature in the context of Rogers' Diffusion of Innovations theory (Rogers 1995), Granovetter's SWT theory (Granovetter 1973; Granovetter 1982) provides a set of propositions that facilitate a specific exploration of the role of varying ties through which information flows. It must be pointed out that SWT, as originally developed, was specifically related to information flow through weak or strong interpersonal ties. Tie strength, however, has been operationalized in varying ways for different studies, thus allowing the theory to be used in interdisciplinary contexts to explore observed relationships and information flow.

Although both diffusion and SWT scholars have dismissed as insignificant the role of published information, "people prefer to turn to other people rather than documents for information" (Levin, Cross, and Abrams 2002, 3), the role of published literature in the life cycle of an innovation cannot be ignored given that scientific papers play a fundamental role as building blocks and progress markers (Evans 2000). Since published papers are the elemental means by which the researcher communicates to the medical community and clinicians are persuaded that research findings are important, published literature can be seen to play a primary role in communicating innovative ideas and technologies within the medical profession. For health practitioners, the role of the published literature as an information conduit has assumed even greater significance with the relatively recent focus on evidence-based practice.

Published literature also plays an important, though less formal role in bringing information to women. A community, mail-based survey in 1999 found that the "number one source of information about menopause was women's magazines (76%)" (Clinkingbeard et al. 1999, 1097); a telephone survey found that printed materials were an important source of information for 44.5% of respondents, with 59.6% of women 50-59 years of age citing the use of printed material (Newton et al. 1998); and qualitative studies confirm the central role of the popular press as a source of HT and menopause information (Griffiths 1999; Jones 1999). Although women rely on information received from their physicians, particularly with regard to HT use (Newton et al. 1998), Jones (1999) states that women are, for the most part, "more interested in obtaining informal than formal knowledge" and that principal sources of informal knowledge include books and magazines (101). This author defines informal knowledge as that which addressed "what a woman should/could do in response to menopausal body changes" as opposed to knowledge that "illuminate[s] the structure and function of these body changes" (101).

In the following discussion the second research question will be addressed as SWT is used as a framework for understanding the role of published literature in the diffusion of innovative ideas. In order to explore this research question, relationships between the following variables and a selection of other factors will be analyzed and discussed: intended audience, publication and articles type, and quotation sources.

4.2.1 Audience

Articles written for medical audiences composed 59.2% (n = 29) of the random sample in this exploratory study; the remaining articles (40.8%, n = 19) were published in consumer publications. Because of the important function of published materials in the flow of information and the varying influence that it carries, contrasting the relationships of medical and consumer publications with WHI impact, voice, and thematic focus of articles provided data that allowed the exploration of published literature as a conduit for the transmission of information.

4.2.1.1 Audience and WHI Impact

The dramatic impact of the WHI study on adopters is highlighted in a *New England Journal of Medicine* (*NEJM*) editorial, which notes that prior to the release of WHI findings there was "a nearly unshakable belief in the benefits of hormone therapy" (Herrington and Howard 2003, 519). This editorial also notes that there were concerning pre-WHI studies that, because of this belief in HT benefit, were largely ignored by physicians. As was previously discussed in the current study, there was a much lower than expected number of implementation stage articles in consumer publications. Since implementation articles focused on pre-adoption concerns related to HT, this suggests that while physicians may have ignored concerning reports about HT, pre-WHI consumers were not even receiving information about potential HT concerns. When the WHI prematurely halted the estrogen plus progestin trial and published study results in *JAMA*, however, the event was reported, discussed and followed in both medical and consumer publications.

In this exploratory study's random sample the majority of consumer articles (65% n = 13) referred to or alluded to the WHI, and a noteworthy proportion of the sample's medical articles (41.4%, n = 12) referred to or cited this landmark study. There was a significant relationship between impact and pre-WHI vs. post-WHI articles ($\chi^2 = 45.152$, df = 1, $p < .001$): all post-WHI articles in this random sample were impacted by WHI results. Since articles were selected based on a combination of search terms representing HT and menopause/postmenopause, these results suggest that, within the time frame of the sample, the WHI impacted all subsequently published articles dealing with HT. Furthermore, there was a relationship between impact and the overall tone expressed by articles: those impacted by the WHI study expressed a higher than expected overall negative or cautionary tone towards long-term preventative HT ($\chi^2 = 17.293$, df = 1, $p < .001$).

The evident impact of WHI results on medical and consumer articles provided an example of novel information flowing between loosely connected medical groups and between medical and consumer populations. According to Granovetter (1973), the link allowing this information flow might be described as a bridging WT. Moreover, when Granovetter "revisited" his theory in 1982, he pointed out that "marginals, in science, can better afford to innovate" (Granovetter 1982, 119). The Office of Research on Women's Health, the group that set the stage for the WHI, represents an innovating marginal such as Granovetter described. Established in 1990 to develop a research agenda that would identify and address gaps in knowledge related to women's health, this group was the response of the National Institutes of Health to the fact that women's health concerns were underrepresented in medical research (Finnegan 1996). WHI results, therefore, were communicated via bridging WTs in the form of the published literature and from an innovating marginal to medical and consumer communities.

4.2.1.2 Audience and Voice

Articles written for the consumer audience had a higher than expected use of a personal voice ($\chi^2 = 15.986$, df = 1), that is, they addressed the reader using personal pronouns or were written in the first person. Medical articles, on the other hand had a higher than expected use of the impersonal, third person voice. In light of the fact that consumer articles were over represented in the early I-D stages (KA, persuasion, and decision) and that in these stages positive innovation attributes were emphasized, the significant use of the personal voice suggests that these articles may have been evoking a more intimate tie with readers. Since SWT research indicates that influence is more likely to flow (Weimann 1983) and innovation adoption is more likely to be stimulated (Weenig 1993) by strong ties, this finding raises the question of whether use of a personal voice may be an effective tool for influencing the perceptions of potential innovation adopters.

4.2.1.3 Audience and Major Theme

While a higher number of consumer articles than expected focused thematically on 'symptom relief' ($\chi^2 = 9.549$, df = 1), a higher proportion of medical articles thematically focused on 'HT as risk' ($\chi^2 = 3.837$, df = 1). These results suggest that just as Granovetter (1973) assumes that ties are "positive and symmetric" (1361), ties created by published literature also have a reciprocal element. Women, for example, expressed more favorable attitudes towards HT as symptom relief than towards HT as long-term preventative therapy (Hemminki and Topo 1997; Hunter, O'Dea, and Britten 1997); results suggest that articles published for this audience demonstrate response to reader attitude and interest by publishing a higher than expected number of articles relating symptom relief. Physicians, on the other hand, are steeped in the biomedical model and tend to focus on quantifying and evaluating risk vs. benefit. This is amply illustrated by the following conclusions of various post-WHI studies: "overall health risks exceeded benefits . . . " (Rossouw et al. 2002, 321), "the risks of estrogen plus progestin outweigh the benefits" (Shumaker et al. 2003, 2651), and "there was no net benefit, even in women considered to be at high risk of fracture" (Cauley et al. 2003, 1729). The relationship between articles intended for medical audiences and the theme 'HT as risk,' suggests a symmetric relationship between the published medical literature and the interests or concerns of their readers.

4.2.1.4 Conclusion: Audience

While a small majority of all articles in the stratified random sample came from medical publications, slightly less than half of these articles were impacted by the WHI. Analysis demonstrated, however, that all post-WHI articles in the sample, whether consumer or medical, were impacted by WHI results. This suggests that the WHI not only impacted all subsequently published articles dealing with HT and menopause, but that through the prominent publication and coverage of results, critical information flowed between medical groups and into the public domain. The Office of Research on Women's Health, by laying the groundwork for this landmark study through their advocacy for research on women's health concerns, demonstrated Granovetter's (1982) observation that "marginals, in science, can better afford to innovate" (Granovetter 1982, 119). Consumer articles made higher than expected use of a personal voice. Since consumer articles were over represented during the early I-D stages, this suggests that use of personal voice may be an effective tool for influencing potential adopters. Significant relationships between audience and specific themes suggest that articles demonstrate response to reader attitude and interest by publishing higher than expected numbers of articles which focus on themes that are of particular interest to their audience. This suggests a symmetric relationship between published literature, a conduit transmitting new information from outside sources into personal networks, and readers, who in turn influence the content of the communicated information.

4.2.2 Publication Type

'Strength of weak ties' theory makes the supposition that different types of interpersonal relationships play different roles in information flow; thus, it is important to consider how WTs and STs might be conceptualized within the context of the literature. The overwhelming evidence presented by diffusion and SWT research demonstrates that strong interpersonal relationships primarily cause innovation adoption and concrete behaviour change (Rogers 1995; Granovetter 1973); the literature, therefore, must be regarded as a WT. Levin, Cross and Abrams (2002), however, propose a construct that can be used to gain a deeper appreciation for the different ways that the literature may function. These researchers, in their investigation of the impact of trust on tie strength, concluded that the structural benefit of a WT's ability to provide non-redundant information could be enhanced by the user's level of trust in the WT. They suggest, "individuals and organizations could benefit from developing trusted weak ties" (25).

The medical literature provides evidence that some published literature is regarded as more reputable or trusted than others. Journal impact factors, for example, are commonly perceived as a measure of the comparative value of a particular journal; thus, information published in a journal with a high impact factor may be accorded greater trust than is information presented in a journal with a lower impact factor. It is also assumed that in order for information to be trustworthy, information must be published in peer reviewed journals and research should be of the highest methodological quality (Greenhalgh 1997). The fact that initial WHI results were presented in *JAMA*, a widely read, peer reviewed journal with a comparatively high impact factor, ensured that the WHI study would receive interest and be perceived with a certain degree of legitimacy and trust by researchers and clinicians, and that results would be disseminated to loosely connected groups throughout the world.

Exploring the relationship of different publication types with I-D stages, confirmation stage articles and author role provided data that allowed further exploration of published literature as a conduit for the transmission of information.

4.2.2.1 Publication Type and Innovation-Decision Stages

This study indicates that, during the time period of the sampling frame, one would be unlikely to find articles with KA characteristics relating to this innovation and published in the peer reviewed, medical literature. The single article (25% of the KA articles) intended for a medical audience, was published in a non-peer reviewed medical news publication; the remaining (75%, n = 3) were in consumer publications. The lack of articles in the peer reviewed literature may be an indication of the fact that long-term preventative HT had already been ideologically adopted by the medical establishment well before the publication of the earliest articles in the random sample. Basic knowledge of the innovation was assumed and thus the literature had only a minimal role in facilitating the flow of fundamental, innovation-related knowledge. In addition, it has been noted that much of the peer reviewed medical literature published during the time period of the sampling frame and prior to the release of WHI findings was related to uncertainty about the expected consequences of long-term preventative HT.

Within the random sample, persuasion stage articles were not found in the peer reviewed literature: 71.4% (n = 5) of the persuasion articles were found in consumer publications and 28.6% (n = 2) were found in non-peer reviewed, medical publications. These results are similar to publication-related findings for KA articles and may, once again, indicate that use of long-term HT for the prevention of disease had already been ideologically adopted within the medical community.

Decision stage articles were published in neither peer reviewed nor the non-peer reviewed medical publications. Although the number of decision articles was very small (n = 2), data derived from articles in the first three I-D stages suggests that readers of consumer publications were later adopters than readers of medical publications. Based on evidence from some qualitative studies, which indicate that physicians frequently functioned to encourage positive HT adoption decisions (Topo, Hemminki, and Uutela 1993; Winterich and Umberson 1999), and based on the previous finding that articles in these early I-D stages expressed overall positive views of long-term HT, it appears these articles functioned to communicate a medicalized view of menopause and to introduce or reinforce the pro-adoption information that many women were receiving from their physicians.

A statistically significant relationship was found between the type of publication and implementation stage articles ($\chi^2 = 6.829$, df = 2, Cramer's V = .373). Peer reviewed medical articles made up 54.2% (n = 13) of implementation stage articles; 20.8% (n = 5) were non-peer reviewed medical articles; and 25% (n = 6) were consumer articles. The higher than expected number of implementation articles in the peer-reviewed literature confirms the observation that, despite the earlier adoption of this innovation by the physician community, there were important questions even before the release of the WHI study about how HT was used, how it worked in practice, operational problems, and how these problems might be solved. Since the majority of articles, which assumed adoption and yet explored many HT related questions, were published in the peer reviewed medical literature, this suggests that the information was communicated between researchers and physicians and/or between loosely connected physician groups via WTs that are generally considered trustworthy. The fact that there was a significant proportion of implementation stage articles in the peer reviewed literature and yet that articles, which raised concern about HT prior to the WHI, were largely disregarded (Herrington and Howard 2003), suggests that there were other sources of information and stronger interpersonal ties that were impacting physician behaviour.

While non-confirmation stage articles appeared primarily in the non-peer reviewed medical literature (42.9% were published in non-peer reviewed medical publications, 28.6% in consumer publications, and only 28.6% in the peer-reviewed publications), 40% (n = 14) of the confirmation stage articles were published in peer reviewed medical publications, 45.7% (n = 16) in consumer publications and 14.3 (n = 5) in non-peer reviewed medical publications. The prevalence of post-WHI articles in both peer reviewed and consumer publications suggests that the literature served as an effective bridging WT by bringing research results from the WHI to the attention of physician and consumer populations.

4.2.2.2 Publication Type and Confirmation Stage Articles

Since a majority of articles in the random sample expressed characteristics of the final I-D stage, confirmation, it is evident that the literature played an important post-WHI role in communicating, discussing and shaping information about the use of HT in the menopause or postmenopause. Confirmation stage articles (n = 35) functioned in the following, sometimes overlapping ways: some provided information for those wishing to avoid the dissonance created by the WHI (28.6%, n = 10); some confirmation stage articles provided information that stimulated or discussed re-evaluation of long-term preventative HT (80%, n = 28); some discussed discontinuance of this therapy (22.9%, n = 8); some suggested or discussed varied use of HT (40%, n = 14); and some suggested or discussed alternatives to long-term HT (25.7%, n = 9). Exploration of the type of publications used to communicate these different approaches to post-WHI health care for women provides insight into the role of the literature as an information conduit.

Some confirmation stage articles discussed study limitations and/or restrictions in study application and thus provided information to those seeking to support or confirm a positive adoption decision. Information that allowed readers to avoid the dissonance created by the WHI was delivered to physicians via peer reviewed (30%, n = 3) and non-peer reviewed (20%, n = 2) medical publications and to consumers via consumer publications (50%, n = 5); thus, individuals from both adopter groups had access to information that might allow them to justify a previous adoption decision. Since "people tend to consult with strong ties before acting on information obtained from weak ties" (Baker and Pettigrew 1999, 447), the results of WT transmitted information, which allowed readers to avoid dissonance caused by the WHI, is likely to be influenced and/or confirmed by personal interactions with friends, family and personal physicians. This role of interpersonal ties is, in fact, noted in a guest editorial published in the *Journal of Obstetrics and Gynaecology Canada*. This editorial focuses on qualifying the applicability of WHI results to real women and communicates the following: the design and interpretation of the WHI study require careful consideration and doctors should "consider how best to synthesize this information for our patients" (Reid 2002, 771). The clear message of this editorial was that doctors, by utilizing the stronger interpersonal ties of the doctor/patient relationship, could and should impact the information that women were receiving, via the WTs of published information, from more distant sources.

Confirmation articles stimulating re-evaluation were predominantly published in peer-reviewed (42.9%, n = 12) and consumer publications (42.9%, n = 12) rather than in non-peer reviewed publications (14.3%, n = 4). These results demonstrate the pivotal role that the WHI played in stimulating re-assessment of long-term preventative HT and the critical role of published articles in bringing that information to both physicians and women. Initial randomized clinical trials failed to show benefit from HT and yet "the results were heavily criticized and, in some cases, disregarded in lieu of the less credible evidence" (Herrington and Howard 2003, 519). Publication of WHI results in a prominent medical journal and subsequent coverage in peer-reviewed publications forced physician adopters to re-evaluate their original adoption decision.

In the consumer community, many women had previously been shielded from knowledge about HT: despite epidemiological studies in which cancer was attributed to estrogen use, "the provision of information to consumers was opposed by the Pharmaceutical Manufacturers Association and the American College of Obstetricians and Gynecologists" (Palmlund 1997a, 163). Furthermore, "some physicians advised that too much attention should not be paid to possible side-effects so as not to frighten women" (Topo 1997, 758). With a similar level of discussion about re-evaluation appearing in both peer reviewed and consumer articles, dissonance was introduced in equal proportions to medical and consumer communities and re-evaluation was equally promoted.

Discontinuance information was minimal in both peer reviewed (12.5%, n = 1) and non-peer reviewed (12.5%, n = 1) medical publications. While there was a greater proportion of other confirmation stage articles in peer reviewed publications (48.1%, n = 13) than in non-peer reviewed publications (14.8%, n = 4), discontinuance may simply be too new of a topic to have made its way into the peer reviewed literature within the time frame of the sample. On the other hand, because of the technological imperative that is apparent within the biomedical model (Nettleton 1995), there may also be a paucity of information within medical groups about treatment discontinuance in the absence of a replacement therapy. The scarcity of information on this topic may thus reflect a general absence of attention within medical fields to the topic of treatment discontinuance.

A greater percentage of confirmation stage articles discussing varied use of HT were found in peer reviewed (42.9%, n = 6) or consumer (42.9%, n = 6) publications than in non-peer reviewed medical publications (14.3%, n = 2). This concentration of articles in both peer reviewed medical publications and consumer publications reinforces the unique qualities of the WHI. Established to rectify the relative neglect of women's health concerns in the medical research (Finnegan 1996), WHI findings were released in *JAMA* and covered in the popular press, thus bringing irrefutably important information to adopters within both the physician and patient communities. The fact that discussion of appropriate HT use has continued in both respected peer-reviewed publications and in consumer publications confirms the importance of on-going, HT-related discussion to prescribing physicians and their patients, and also confirms the critical function of the literature as bridge over which information flows between loosely connected groups.

4.2.2.3 Publication Type and Author Role

A higher than expected number of articles in peer reviewed publications had authors who were identified ($x2 = 24.837$, $df = 2$, Cramer's $V = .712$, $p < .001$). This contrasts with non-peer reviewed medical and consumer publications, which had a lower than expected number of identified authors. A further breakdown of author identity demonstrates that those who were identified would be viewed as 'experts': 72.7% ($n = 16$) of identified authors were physicians, professors and/or individuals with doctorate degrees; among the remaining 27.3% ($n = 6$), authors had qualifications that would likely identify them to readers as 'experts' (for example, editor of *A Friend Indeed* newsletter, executive director of the National Women's Health Network, and a 'women's health advocate'). It is interesting to note that our culture links claims of expert knowledge with power and status (Nettleton 1995); a claim or perception of expertise might therefore strengthen the apparent validity of communicated information. Although the relationship between peer reviewed publications and identified authors was not unanticipated, it reinforces the suggestion that peer reviewed publications represent a type of 'trusted' WT and may thus have the potential to exert greater influence than other WTs.

4.2.2.4 Conclusion: Publication Type

The type of publication in which an article appears plays a role in the influence of that article. The initial publication of WHI results in a widely read, peer reviewed journal with a comparatively high impact factor, for example, ensured that it would receive interest and be perceived with trust by researchers and clinicians, and that related information would be disseminated to loosely connected medical and consumer groups. The higher than expected number of implementation stage articles that was found in peer reviewed medical publications suggests that prior to the publication of WHI findings, questions about HT use were being communicated between groups of physicians. The prevalence of post-WHI articles, and particularly articles that stimulated HT re-evaluation, in peer reviewed and consumer publications, however, suggests that the literature served as an effective bridging WT in bringing WHI research results and subsequent discussions to the attention of both physician and consumer populations. A relationship was found between peer reviewed publications and articles in which author role was identified. Since a claim or perception of author expertise strengthens the apparent validity of communicated information, this finding reinforces the suggestion that peer reviewed publications represent a type of 'trusted' WT and may thus have the potential to exert greater influence than some other WTs.

4.2.3 Article Type

The majority of articles in the random sample were review style articles (55.1%, n = 27), while research and editorial articles each made up 22.4% (n = 11) of the sample. Review articles were published primarily in consumer publications (55.6%, n = 15); the majority of editorial articles appeared in medical publications (54.4%, n = 6); and research articles (n = 11) were found only within medical publications. Because article type impacts the way readers perceive information, the relationship between this variable and publication type, I-D stage, and confirmation stage articles provided input into this exploration of the information-carrying ties created by the published literature.

4.2.3.1 Article Type and Publication Type

The majority of articles within peer reviewed publications in the sample were research style articles (61.1%, n = 11), whereas 22.2% (n = 4) were editorials and 16.7% (n = 3) were review articles. Non-peer reviewed medical articles were primarily review articles (81.8%, n = 9) and a smaller proportion were editorial articles (18.2%, n = 2). Consumer articles were 75% (n = 5) review articles and 25% (n = 5) editorial pieces. While peer reviewed publications may be regarded as more trustworthy vehicles for scientific knowledge, both Diffusion of Innovations and SWT theories demonstrate that it is interpersonal relationships that primarily cause innovation adoption and concrete behaviour change. Analysis of data from this exploratory study suggests that information presented in review and editorial articles may be brought to readers in a potentially more personal manner: 18.4% (n = 9) of the random sample used a personal voice in addressing readers and 100% of articles using personal voice were review (66.7%, n = 6) and editorial (33.3%, n = 3) articles. This suggests that although physician readers may regard research-oriented, peer reviewed journals as more trustworthy, some reviews and editorials may establish a 'trusted' tie with readers through the use of personal voice.

4.2.3.2 Article Type and Innovation-Decision Stages

The majority of articles in the first three I-D stages were review style: 75% (n = 3) of KA articles were review articles, this article type made up 71.4% (n = 5) of persuasion stage articles, and all of the articles in the decision stage were review style (n = 2). The remainder were editorial style: 25% (n = 1) of KA stage articles and 28.6% (n = 2) of persuasion articles were editorials. The fact that adoption was already widespread during the time period of the sampling frame (Pitkin 2002) might lead to the assumption that research style articles related to this medical innovation had been published previously. Research-based knowledge was, however, lacking. All KA, persuasion and decision stage articles in the sample were published prior to July 2002 and yet at that time there was an absence of any large-scale clinical trials exploring the overall risk-benefit ratio of long-term HT. Despite the lack of research-based articles, this preventative therapy had been adopted by many prescribing physicians and users (Herrington and Howard 2003). The data indicates that reviews and editorials rather than research-based articles were the principal vehicles for persuading readers, who were primarily consumers, to form a favorable attitude towards long-term preventative HT. Rogers (1995) asserts that at the persuasion stage "the main type of thinking . . . is affective (or feeling)" (168) rather than cognitive. Because reviews and editorials allow the author to select the information that is presented and these types of articles are more likely to use a personal voice, it might be argued that persuasive information flows more readily to readers via review and editorial style articles.

There was a greater than expected proportion of research articles in the implementation stage; therefore, a statistically significant relationship was found ($\chi^2 = 9.98$, df = 2, Cramer's V = .451). As noted earlier, a higher proportion of implementation stage articles than expected also focused thematically on 'HT as risk.' These results suggest the importance of the information that was presented to readers during this time period. While adoption had occurred and many individual women were being pressured, despite personal misgivings, to take HT (Hvas 2001; Winterich and Umberson 1999), the prevalence of research-oriented, implementation stage articles prior to the release of WHI findings and the relationship between implementation articles and the theme 'HT as risk' raises important questions about the adoption of long-term HT by prescribing physicians. An article in the well-regarded women's newsletter, *A Friend Indeed*, clearly points out the problem: "the practice of prescribing healthy women HRT came before the medical evidence that should have underpinned HRT prescription guidelines" (O'Grady 2002, 2). This suggests that despite awareness created by WTs, prescription patterns were being influenced by STs within physicians' personal networks.

The majority of confirmation stage articles were review style (54.3%, n = 19); 20% (n = 7) were research articles and 25.7% (n = 9) were editorial style articles. The greater proportion of review style articles was anticipated as many confirmation stage articles were dealing directly with WHI research results. There were a greater proportion of editorial style confirmation articles than in the group of non-confirmation stage articles (14.3% (n = 2) of non-confirmation articles were editorial style). These results suggest that, since editorial style articles bring the views of the writer to the reader or provide commentary on an issue, there was more information presented to readers from a slightly informal or personal perspective in the wake of the WHI. Given that the evidence presented by diffusion and SWT research demonstrates that interpersonal relationships primarily cause concrete behaviour change, this more personal presentation of information may have played a role in the rapid response, overt controversy, and behaviour change that the WHI findings evoked.

4.2.3.3 Article Type and Confirmation Stage Articles

There were no research articles that demonstrated confirmation stage characteristics and at the same time functioned to provide information to those wishing to avoid the dissonance created by the WHI. Review and editorial style articles each comprised 50% (n = 5) of the AD articles. These results reinforce concern about the medicalization of menopause and bring into focus the contention of authors who argue that long-term preventative HT was an ideologically driven therapy without sufficient research base (Meyer 2001; National Women's Health Network 2002). Given the profound impact of the WHI on all subsequently published articles in the sample, as well as the fact that WTs function in concert with STs (Granovetter 1982), it is unlikely that articles transmitting this selective information would effectively prevent dissonance unless STs within the adopters' personal networks also communicated information that supported or confirmed the previous adoption decision.

Confirmation stage articles stimulating re-evaluation were primarily review style articles (53.6%, n = 15); 25% (n = 7) were research oriented and 21.4% (n = 6) were editorial. Since WHI results were released over a period of time and in a number of different articles, it is not surprising that the majority of subsequent articles stimulating re-evaluation of long-term HT were reviews of research findings. Review articles are, in fact, frequently evidence of the WTs existing within physician communities; they not only serve as critical bridges between the original study and diverse physician and consumer groups, they also may become "a means by which the building blocks of scientific knowledge are recorded and made available as a resource to other researchers" (Genuis 2003, 31).

Among confirmation articles discussing varied HT use, 57.1% (n = 8) were review style, 35.7% (n = 5) were editorial style, and 7.1% (n = 1) were research style. These results indicate that much of the discussion about varied HT use was not based on new, original research but on WHI results and previously conducted research. In addition, commentary or editorial style articles contributed to discussion of variant HT use.

All of the confirmation stage articles that discussed HT alternatives (n = 9) appeared in review style articles. Although the prevalence of these review articles suggests that there is research-oriented material available for review, it is concerning that, despite the needs of the many women who had relied on the therapeutic promises of HT, there were no research-oriented articles that focused on potential alternatives to HT within the random sample. Love (2003), in her consumer health book, notes that women are being left with the question of what to do in the post-WHI world. This physician author points out, "if you're experiencing unpleasant symptoms right now, even next month can be a long time away" (170). The paucity of research style articles raises serious concerns about the tools available to members of the medical profession as they deal with the needs of patients.

These findings also bring attention to the fact that although lay articles may bridge the gap between medical and consumer worlds and bring medical information into the public arena, the agendas of the research community and the consumer are frequently misaligned. It has been pointed out that this is probably the results of "commercial funding bias; vested researcher interests; professional dominance of research (ie, medical and surgical professions directing research funding); publication bias (our results showed that 94% of all studies provided a positive conclusion); and a lack of consumer involvement in research (ie, consumers not consulted about priorities)" (Tallon, Chard, and Dieppe 2000, 2040). While it is clear that dialogue with consumers early in the research process will improve the relevancy of results to the people whom researchers are hoping to help, it is also clear that research addressing the questions of patients will assist physicians who are seeking to provide relevant information to their patients.

4.2.3.4 Conclusion: Article Type

While the majority of articles within the random sample were review articles, the majority of articles in peer reviewed publications were research style articles. Peer reviewed, research style articles may be regarded as more trustworthy vehicles for scientific knowledge by researchers and physicians; however, some reviews and editorials may establish a 'trusted' tie with readers through the use of selected material and personal voice. Diffusion of Innovations and SWT theories demonstrate that it is interpersonal relationships that primarily cause innovation adoption and concrete behaviour change. Results suggest that reviews and editorials rather than research-based articles were the principal vehicles for bringing pro-adoption information to readers in the early I-D stages. During the implementation stage there was a greater than expected proportion of research style articles. The prevalence of these articles prior to the release of WHI findings and the relationship between implementation articles and the theme 'HT as risk' suggests that despite awareness created by WTs, prescription patterns were being influenced by STs within physicians' personal networks. The majority of confirmation stage articles were review articles; this potentially more selective and/or more personal presentation of information may have played a role in the rapid response, overt controversy, and behaviour change that the WHI findings evoked. Review articles may also be viewed both as critical bridging WTs between the original study and diverse physician and consumer groups, and they may be viewed as the means by which building blocks of scientific knowledge are recorded and made available to clinicians and researchers.

4.2.4 Quotation Sources

During content analysis, sources of quoted material were noted in order to explore potential relationships and consider the role of quotations in information transmission via published literature. There were too few quotes from industry representatives or HT users for statistical analysis; in both cases, only 2 of the 49 articles in the random sample contained quotes from these sources. It should be noted that given the growing challenge of industry influence on individual physicians, researchers and academics, it is highly likely that at least some of the designated 'experts,' as defined for content analysis, received funding from industry (Angell 2000; Moynihan 2003b; Wazana 2000). For the purposes of research question two, the relationships between articles with quotes from designated 'experts' or from 'government or medical society representatives' and other variables were explored.

4.2.4.1 Quotations from 'Experts'

'Experts' were quoted in 49% (n = 24) of articles and a significant relationship was found between articles quoting experts and article type ($\chi^2 = 18.065$, df = 2, Cramer's V = .607, $p < .001$). While research articles had a lower than expected number of quotes from experts, review style articles used experts' quotes to a higher than expected degree. Because peer reviewed articles comprised only 11.1% (n = 3) of the review articles identified within the random sample and because formal review articles published in peer reviewed journals are unlikely to use quotations, this suggests that quotations from experts were more prevalent in non-peer reviewed, medical articles and consumer articles. Non-peer reviewed, medical articles comprised 33.3% (n = 9) of review articles within the sample; 55.6% (n = 15) of review articles were found in consumer publications. While the higher use of quotes from experts within review articles may intuitively suggest that readers will take more notice of presented information, there are explanations for this likely occurrence: (1) as noted earlier and as discussed by

Nettleton (1995), the role of experts within our culture has led to the perception that expertise strengthens the validity of communicated information; and (2) because influence is more likely to flow through closer interpersonal ties (Weimann 1983), the use of a real person may strengthen the perception of personal tie, thus increasing the strength of the WT created by the literature. Furthermore, Rogers (1995) notes that when diffusion pathways are *heterophilous*, thus "spanning two sets of socially dissimilar individuals in a system" (Rogers 1995, 287), people are likely to seek leadership from those with more formal education, with higher socioeconomic status, and with a greater degree of media exposure (Rogers 1995). This suggests that the use by consumer publications of quotes from experts may well serve to foster a perception of leadership and thus strengthen the role of the literature as a link between medical and consumer communities.

4.2.4.2 Quotations from 'Government or Medical Society Representatives'

Seven articles in the sample (14.3%) used quotes from government or medical society representatives. While there were no significant relationships between these articles and other factors, some interesting observations were made from the data: the largest proportion of articles containing quotes from these 'official' sources (85.7%, n = 6) appeared in confirmation stage articles stimulating re-evaluation; the majority (57.1%, n = 4) of these articles expressed an overall negative view of long-term preventative HT; and 85.7%, (n = 6) focused thematically on 'scientific information,' while 71.4% (n = 5) thematically addressed 'dissonance following WHI.' These observations suggest that within this random sample, 'official' sources were more evident following the release of WHI results and that these sources projected a cautionary view of long-term HT. Just as the strength of a tie is an intuitive concept (Granovetter 1973), trust is also to some degree intuitive. Since most people instinctively trust information from government and medical authorities, it can be hypothesized that the WTs created by published articles may be perceived as more trustworthy if they contain quotations from officials representing government bodies or medical societies.

4.2.4.3 Conclusion: Quotation Source

A significant relationship was found between articles quoting experts and article type: review style articles used quotes from experts to a higher than expected degree. Because expertise strengthens the perceived validity of communicated information, and because people are likely to seek leadership from those with more formal education, with higher socioeconomic status, and with a greater degree of media exposure, it is likely that the use quoted experts may well serve to strengthen the role of the literature as a bridging WT between loosely connected groups. Quotes from government or medical society representatives were more evident in articles published following the release of WHI findings and articles using quotes from these sources tended to project a negative or cautious overall view of long-term preventative HT. Since most people instinctively trust information from government and medical bodies, it can be hypothesized that published articles may be perceived as trustworthier if they contain quotations from these sources and, consequently, the literature's function as a WT may consequently be strengthened.

4.2.5 Research Question 2: Summary of Results and Discussion

Using content analysis and Granovetter's SWT theory for context (Granovetter 1973), this study explored the role of varying tie strength in the flow of information. In particular, the potential role of 'weak trusted ties' in the I-D process of long-term preventative HT was investigated. In order to examine these issues, articles were analyzed to identify the following variables: intended audience for articles, publication type, article type, and sources of quotations. Relationships between these variables and a variety of pertinent factors were explored.

Although Granovetter's (1973) theory related to information flow through interpersonal ties, published literature provides a conduit through which information flows between networks and can thus be viewed as a bridging tie between loosely connected groups. For health practitioners, the role of the published literature as an information channel has assumed even greater significance with the relatively recent emphasis on evidence-based practice. Published articles also play an important, though less formal role, in bringing medical information to consumers.

A small majority of all articles in the stratified random sample were written for a medical audience and the remainder was written for consumers, most of which were women. Whether consumer or medical, however, all post-WHI articles in the sample were impacted by WHI results. This indicates not only a direct association between the WHI and all subsequently published articles dealing with HT and menopause, it also demonstrates that through the prominent publication and coverage of results, key information flowed between medical groups and into the public domain. There was also a relationship between impact of the WHI and tone: articles impacted by the WHI expressed a higher than expected overall negative or cautious view of long-term preventative HT. The Office of Research on Women's Health, by laying the groundwork for this landmark study through their advocacy for research on women's health concerns, demonstrated Granovetter's (1982) observation that "marginals, in science, can better afford to innovate" (Granovetter 1982, 119).

Consumer articles made higher than expected use of a personal voice. This suggests that articles may have been evoking a more intimate tie with readers. Since consumer articles were particularly evident during the early I-D stages, this raises the possibility that use of personal voice may effectively influence and/or persuade readers.

A higher number of consumer articles than expected focused on the 'symptom relief' theme, while a higher proportion of medical articles thematically focused on 'HT as risk.' The significant relationships between audience and specific themes, which are of interest or concern to the given audience, suggests a symmetric relationship (Granovetter 1973) between published literature, a conduit transmitting new information from outside sources into personal networks, and readers, who in turn may influence the content of the communicated information.

While it is understood that different types of interpersonal relationships play different roles in information flow, it has also been proposed that the structural benefit of a WT's ability to provide non-redundant information could be enhanced by the level of trust in the WT (Levin, Cross, and Abrams 2002). The initial publication of WHI results in a widely read, peer reviewed journal with a comparatively high impact factor, for example, ensured that it would receive interest and be perceived with trust by researchers and clinicians and, in turn, that related information would be disseminated to consumer groups.

Few articles were found in the peer reviewed literature that had characteristics of the three early I-D stages. This may be an indication that long-term preventative HT had already been ideologically adopted by the medical establishment well before the publication of the earliest articles in the random sample. On the other hand, the concentration of these articles in consumer publications and their positive view of long-term HT suggest that these articles functioned to introduce or reinforce pro-adoption information to potential HT users. The higher than expected number of implementation stage articles that was found in peer reviewed medical publications suggests that, despite the gap between research findings and clinical practice during this time period, questions about HT use were being communicated through the medical literature.

The prevalence of post-WHI articles in both peer reviewed and consumer publications indicated that the literature served as an effective bridging WT in bringing WHI research results and subsequent discussions to the attention of both physician and consumer populations. The majority of articles published after the release of WHI findings stimulated or discussed re-evaluation of long-term preventative HT. With a similar level of discussion appearing in both peer reviewed and consumer articles, dissonance was introduced in equal proportions to medical and consumer communities and re-evaluation was equally promoted.

A relationship was found between peer reviewed publications and articles in which author role was identified; identified authors in both medical and consumer publications had qualifications that would likely identify them to readers as 'experts.' Since a claim or perception of author expertise strengthens the apparent validity of communicated information, this finding reinforces the suggestion that peer reviewed publications represent a type of 'trusted' WT and may thus have the potential to exert greater influence than some other WTs.

The majority of articles in the entire random sample were review style articles; however, the majority within peer reviewed publications were research style articles, and non-peer reviewed medical publications as well as consumer publications had primarily review articles, with a smaller proportion of editorial articles. Although physician readers may regard research-oriented, peer reviewed journals as more trustworthy sources of information, reviews and editorials allow the author to select the information that is presented and they are more likely to use a personal voice. Thus, they may establish a 'trusted' WT relationship by subliminal suggestion of a more personal connection to readers.

Results indicate that reviews and editorials were the principal medium for bringing pro-innovation adoption information to readers in the early I-D stages; conversely, there was a greater than expected proportion of research style articles during the implementation stage. The prevalence of these articles and the relationship between implementation articles and the theme 'HT as risk' suggests that despite awareness of important HT-related questions communicated through the literature, prescription patterns were being influenced by other sources of information and stronger interpersonal ties within physicians' personal networks.

The majority of confirmation stage articles were review articles. This potentially more selective and/or more personal presentation of information, coupled with the prominent initial release of research results in *JAMA*, may have played a role in the rapid response, overt controversy, and behaviour change that the WHI findings evoked. While the lack of further research articles during this I-D stage raises serious concerns about the options available to those women who suffer from menopausal or postmenopausal symptoms, there is a recognized gap between the immediacy of consumer need and the slow process of producing and publishing relevant, high quality research. Despite the prominence of review articles in the confirmation stage, these articles may be viewed as both critical bridging WTs between the WHI and diverse physician and consumer groups, and they may be viewed as the means by which building blocks of scientific knowledge are recorded and made available to researchers, clinicians and consumers.

Because quotations within articles bring personal names and identities into a potentially impersonal medium, the role of quotations was considered in this exploration of the role of published literature. A significant relationship was found between articles quoting experts and article type: review style articles used quotes from experts to a higher than expected degree. Because expertise strengthens the perceived validity of communicated information and because the use of a real person may strengthen the perception of personal connection, articles using expert quotations may assume the role of a 'trusted' WT. Readers are also likely to seek leadership from those with more formal education, with higher socioeconomic status, and with a greater degree of media exposure; therefore, the use of quotes from experts may well serve to foster a perception of leadership and thus strengthen the bridging role of the literature. Quotes from government or medical society representatives were more evident in articles published following the release of WHI findings and tended to project a negative or cautious overall view of long-term preventative HT. Most people instinctively trust information from government and medical bodies; this, therefore, suggests that published articles may be perceived as trustworthier if they contain quotations from representatives of government or medical societies. As a result, articles with quotes from these sources may assume an aura of authority and thus exert stronger influence on readers.

This exploratory study does not specifically explore the role of librarians and information professionals in influencing change within medical fields. Physicians and other health care professionals, however, require up-to-date and valid information on a regular basis if they are to provide optimal patient care; yet the sheer volume of articles on medical issues published annually makes careful evaluation of the literature a challenging proposition. Libraries can play a critical role in supporting access to and effective use of the literature; these activities will, in turn, facilitate the role of the literature as a bridging WT, which carries novel information between loosely connected medical groups and between medical and consumer communities.

4.3 RESEARCH QUESTION 3: RESULTS AND DISCUSSION

Research Question 3: How has the WHI study impacted the expression of the biomedical model vs. normal life transition model within the literature?

In July 2002, the estrogen plus progestin trial within the WHI study was prematurely halted following determination that "overall health risks exceeded benefits" (Rossouw et al. 2002, 321). Results of this long anticipated RCT were communicated to the medical community in a prominent medical journal and subsequent articles in the popular press, for example *Time* magazine's cover story on July 22, 2002 (Gorman et al. 2002), functioned as bridging WTs, which brought WHI results to consumers. Thus, the diffusion of HT as a long-term preventative treatment regime for menopausal and postmenopausal women was irreversibly impacted. What remains yet undetermined is whether WHI results impacted the pervasive expression within published literature of the biomedical model, a model which undergirds the medical management of middle-aged and older women in our culture (Harding 1997).

The biomedical model was expressed within the random sample by articles that were identified during content analysis as presenting the view that the body is machine-like and can be 'fixed' with appropriate medical intervention. Explanation of experiences during the menopause or postmenopause period focused on biological changes, with a relative neglect of social context, and menopause was viewed as a deficiency disease that required medical regulation and supervision. In contrast to this view, the normal life transition model was expressed by articles that communicated a view of menopause as a naturally occurring phase of life, which is impacted by cultural and social factors (Flint and Samil 1990; Gonyea 1996; Love 2003). While medical assistance might be sought for specific physical problems, articles expressing this view of menopause did not present the life phase itself as an illness.

The prevalence of the biomedical model within the menopause-related, published literature has been well documented (Hunter, O'Dea, and Britten 1997); in fact, even the accepted terminology used in the vast majority of articles demonstrated a biomedical view of women's health. The phrase 'hormone replacement therapy,' for example, directly implies that women's bodies following menopause are deficient and that, through the administration of exogenous hormones, balance may be restored (Worcester and Whatley 1992). Among those articles that could be clearly identified as expressing the biomedical model or the normal life transition model (n = 43), 83.7% (n = 36) were identified as reflecting the former approach and 16.3% (n = 7) reflected the latter view. Although dominance of the biomedical model resulted in a lack of statistically significant findings, data from the content analysis did allow some interesting observations regarding the impact of the WHI on the expression of the biomedical model vs. normal life transition model within the literature

In the following discussion, the third research question will be addressed by exploring the relationship between articles that demonstrate a biomedical approach or a normal life transition approach, and the following variables: audience, WHI impact, I-D stages, innovation attributes, projected tone, *symptoms*, and major themes.

4.3.1 **Biomedical vs. Normal Life Transition Models and Audience**

Because "doctors are more likely to conceptualize menopause in terms of illness or disease, than women, who tend to regard it as a part of everyday life," (Hunter, O'Dea, and Britten 1997, 1546) the biomedical and normal life transition models are sometimes discussed within the context of "medical discourse" vs.

"women's health discourse" (Harding 1997, 138). In this exploratory study, however, results suggest that a similar proportion of medical articles and articles drawn from women's magazines and consumer publications expressed the two conceptual models: 83.3% (n = 20) of the medical and 84.2% (n = 16) of the consumer articles expressed the biomedical model, while 16.7% (n = 4) of the medical and 15.8% (n = 3) of the consumer publications expressed the normal life transition model.

Since the biomedical model is the "dominant paradigm of Western medicine" (Nettleton 1995, 2), it might be anticipated that the majority of medical articles would demonstrate this model. The predominance of this model in consumer articles, although standing in contrast to qualitative studies indicating women's interest in alternatives to HT and their apprehension about the long-term implications of HT (Hunter, O'Dea, and Britten 1997; Stephens, Budge, and Carryer 2002; Winterich and Umberson 1999), confirms the findings of other researchers. Worcester and Whatley (1992), for example, note, "the information women get in the lay press is very much biased towards the use of hormones" (7). These authors then point to testimony before a committee of the Food and Drug Administration, which presented a study of articles published between 1985 and 1988 in which three quarters of articles on this topic published in popular women's magazines "were clearly pro-hormones" and "fully half of the articles did not even mention any risks with oestrogen use" (7). In addition, in an overview of the estrogen marketing to physicians and women, Palmlund (1997) observes that many cultural products, including books and women's magazines, communicate definitive messages about how women should understand the postmenopausal phase of life and "are overt arguments for the use of hormone therapy" (162). Results, therefore, appear to confirm previous findings: the biomedical model is a primary influence in both medical and consumer articles.

4.3.2 Biomedical vs. Normal Life Transition Models and WHI Impact

While 50% (n = 18) of articles reflecting the biomedical view were found in the pre-WHI time period and the same percentage was found post-WHI, 14.3% (n = 1) of the articles demonstrating characteristics of the normal life transition model were pre-WHI articles and 85.7% (n = 6) were published post-WHI. Although the total number of normal life transition articles was small, this represents an increase from 5.3% (n = 1) of all pre-WHI articles to 25% (n = 6) of all post-WHI articles, thus suggesting a noteworthy increase in articles that view menopause as a normal phase of life rather than a deficiency disease. Given the fact that the biomedical model pervades our culture and has profoundly impacted the medical care of women throughout their lifespan (Love 2003; Nettleton 1995), this increased proportion of normal life transition articles may indicate that the WHI provided evidence that opened the door to discussions of women's normal life development rather than their midlife decline into illness. Hunter, O'Dea and Britten (1997), in their qualitative study investigating women's accounts of HT decision-making, described the *orthodox* (reflecting the biomedical model) vs. *unorthodox* (personal ideas and opinions, which were often critical of physicians) accounts that resulted when women talked about their views of medication. Just as these investigators found that the informal interview setting may have enabled women to voice their unorthodox views, it is possible that the publication of the WHI enabled the increased expression of an unorthodox model, the normal life transition model.

4.3.3 Biomedical vs. Normal Life Transition Models and Innovation-Decision Stages

All articles in the first three I-D stages (knowledge acquisition, persuasion, and decision) were identified as representing the biomedical model. Beginning at the implementation stage, there was evidence of the normal life transition model: the majority of implementation stage articles (84.2%, n = 16) reflected the biomedical approach, but 15.8% (n = 3) reflected the normal life transition view of menopause. In the confirmation stage, the proportion of normal life transition articles increased to 21.9% (n = 7), while the proportion of biomedical articles decreased (78.1%, n = 25). Although these percentages confirm the dominance of the biomedical model, the small increase in articles presenting menopause as a normal life transition suggests that the WHI did impact basic conceptions about health and well-being.

Beginning in the early twentieth century and continuing into the latter part of the century, menopause was transformed into a medical problem with a medical solution (Bell 1987). Wilson (1966), in his book *Feminine Forever*, popularized the idea that menopause was an unnatural stage that could be easily rectified by exogenous hormones; thus, menopause became "a symbolic entrance into an era in life, when a woman is connected with a medical doctor in a long-term relationship where they share concerns over the health of the woman's body" (Palmlund 1997b, 88). The view of menopause as a deficiency state that could and should be resolved through the long-term use of HT became so imbedded in pre-WHI medical and popular culture that "refraining from prescribing HRT seem[ed] to necessitate specific justification" (Palmlund 1997a, 160). The biomedical model therefore, explicitly impacted women in the pre-WHI environment: the body was separated from its social and cultural context and, like a machine, became something that needed to be managed and fixed (Nettleton 1995); doctors became dispensers of required technology, a treatment imperative emerged, and the explanation for health problems became focused on the biological (Topo, Hemminki, and Uutela 1993). An entire population of healthy women was thus assigned the specific disease entity, estrogen deficiency.

From my reading of qualitative studies related to HT use and the HT decision-making of women, it is apparent that women had, in the past, maintained an uneasy balance between their own inclinations to consider menopause as a normal and natural transition, the need of some to deal with troublesome symptoms, and the treatment imperative demonstrated by the medical profession. A woman in Winterich and Umberson's (1999) series of in-depth interviews best illustrates this ambivalence: despite disagreeing with her physician's view of menopause as "a time to begin life-long medication," this individual reluctantly commented that she may as well avoid the *symptoms* described to her by the doctor and thus have a "drug-induced, natural existence" (65). Despite the apparent entrenchment of the biomedical model, content analysis of the random sample demonstrated that, beginning with the post-adoption uncertainty demonstrated in implementation stage articles, the presumptions of the biomedical approach were questioned in at least some articles. With the publication of WHI results and the resulting confirmation stage articles, both doctors and women were provided with information that demanded reconsideration of long-term HT and thus, they were given permission to question the suppositions of the biomedical model and explore the idea of menopause as a normal life transition.

4.3.4 Biomedical vs. Normal Life Transition and Innovation Attributes

The majority of articles expressed the biomedical model regardless of whether they demonstrated innovation attributes in a positive or negative light; however, a greater proportion of biomedical model articles expressed the positive attributes of long-term preventative HT than did normal life transition articles (see figure 1). Although the number of normal life transition articles was small, it was apparent that within the expression of each innovation attribute, the proportion of articles expressing the biomedical model decreased and the proportion of articles expressing the normal life transition model increased when innovation attributes were presented in a negative manner (see table 8, page 130). Specifically, the proportion of normal life transition articles increased when innovation attributes were presented in the following way: HT did not have relative advantage over other options or non-treatment; HT was not compatible with the beliefs, values or needs of adopters; this therapy was more complex than simple and was not easily trialable; and positive benefit from HT was not observable. Although the number of articles was too small for statistical analysis, results suggest that articles expressing the biomedical model presented a more positive view of the attributes of long-term HT, whereas articles expressing the normal life transition model presented a more negative view of the innovation attributes of this therapy. Indeed, the benefits of long-term preventative HT for healthy women were not presented in a positive light by feminist literature that presented menopause as a normal and healthy transition phase (Coupland and Williams 2002; Worcester and Whatley 1992).

Figure 1.

POSITIVE ATTRIBUTES OF LONG-TERM PREVENTATIVE HT IN ARTICLES DEMONSTRATING BIOMEDICAL VS. NORMAL LIFE TRANSITION MODEL

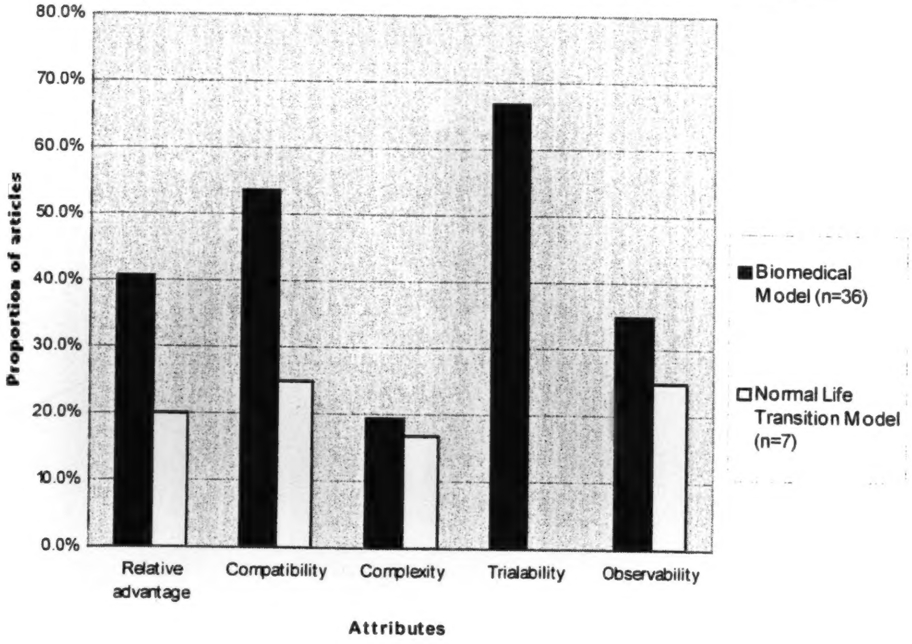


Table 8. Percentage of biomedical and normal life transition articles presenting positive and negative innovation attributes

Innovation Attributes	Biomedical Model	Normal Life Transition Model
Relative advantage		
- Positive attribute	91.7% (n = 11)	8.3% (n = 1)
- Negative attribute	80.0% (n = 16)	20.0% (n = 4)
Compatibility		
- Positive attribute	93.8% (n = 15)	6.3% (n = 1)
- Negative attribute	81.3% (n = 13)	18.8% (n = 3)
Complexity		
- Positive attribute	83.4% (n = 5)	16.7% (n = 1)
- Negative attribute	80.8% (n = 21)	19.2% (n = 5)
Trialability		
- Positive attribute	100.0% (n = 2)	50.0% (n = 1)
- Negative attribute	0.0% (n = 0)	50.0% (n = 1)
Observability		
- Positive attribute	87.5% (n = 7)	12.5% (n = 1)
- Negative attribute	81.3% (n = 13)	18.8% (n = 3)

4.3.5 Biomedical vs. Normal Life Transition and Projected Tone

The majority of articles expressing a positive or a negative view of long-term preventative HT demonstrated the biomedical model: 92.3% (n = 12) of positive articles and 80% (n = 12) of negative articles came from the biomedical perspective. The proportion of articles written from the normal life transition perspective, however, was higher in articles projecting a negative overall tone towards long-term HT: 7.7% (n = 1) of articles projecting a positive tone were normal life transition articles, whereas 20% (n = 3) of articles projecting a negative tone expressed this model. Although these results might be anticipated, they suggest that a negative view of HT facilitates the expression of the normal life transition model; conversely, one might wonder whether the adoption of the normal life transition model would decrease the view of menopause as a problem requiring medical attention and increase the appreciation of menopause as a "biopsychocultural" event – a natural biological event experienced within the context of other important life events and experienced differently in various cultures and settings (Flint and Samil 1990, 145). Cousins and Edwards (1999) raise this point: "if the experiences of women at menopause were viewed as a more natural course of events . . . then perhaps a health-promoting approach using the simpler strategies that mother nature intended for us . . . would make more sense" (Cousins and Edwards 2002, 332).

4.3.6 Biomedical vs. Normal Life Transition Models and *Symptoms*

The promotion of long-term preventative HT was sequentially marketed on the basis of three major diseases that were linked with low estrogen levels: osteoporosis, heart disease, and Alzheimer's disease or other dementias. Thus, it was on the basis of these three supposed *symptoms* of hormone deficiency that healthy menopausal and postmenopausal women were urged to take HT on a long-term basis (Meyer 2001). These *symptoms* powerfully enabled the biomedical approach to women's health: pharmacological intervention facilitated an approach to menopause that overlooked social and cultural context and thus, major obstacles to women's health, "such as lack of leisure time, [women's] complex and often self-sacrificing social roles to family, lack of access to sport faculties, as well as inadequate finances to invest in their health and wellness to health and well-being" (Cousins and Edwards 2002, 337), were more easily ignored. In addition, these so-called *symptoms* of menopause contributed to the construction of this life phase as a time of health risk (Palmlund 1997b) and to the obligation of women to avail themselves to HT in order to maintain socially appropriate roles (Harding 1997).

Content analysis of medical and consumer articles published between 1999 and October 2003 demonstrated that the articles coming from a biomedical perspective and those coming from the perspective of menopause as a normal life transition discussed osteoporosis and its relationship to menopause and postmenopause in similar proportions: 75.9% (n = 22) of biomedical articles discussed or mentioned osteoporosis and 75% (n = 3) of normal life transition articles discussed this condition. An increased proportion of biomedical articles discussed the relationship between menopause and cardiac disease (79.3%, n = 23), while a smaller proportion and small number of normal life transition articles discussed cardiac disease (50%, n = 2). A minority of both biomedical (44.8%, n = 13) and normal life transition articles (25%, n = 1) discussed the relationship between menopause and cognitive decline or dementia. The association between cognitive decline and estrogen deficiency is relatively recent. The first observational study suggesting this link was published in 1994 (Paganini-Hill and Henderson 1994), and therefore the smaller proportion of both biomedical and normal life transition articles that discussed this *symptom* might be expected. The relatively high proportions of articles discussing other *symptoms* demonstrated the integral location of *symptom* discussion within articles related to menopause and HT. Coupland and Williams (2002), in their text based discourse analysis, demonstrate that even within the 'alternative therapy discourse,' which emphasized personal control of health management and the broader context of life, there was focus on the association between menopause, problematic *symptoms* and the need to find solutions, albeit 'natural' solutions.

4.3.7 Biomedical vs. Normal Life Transition Models and Major Themes

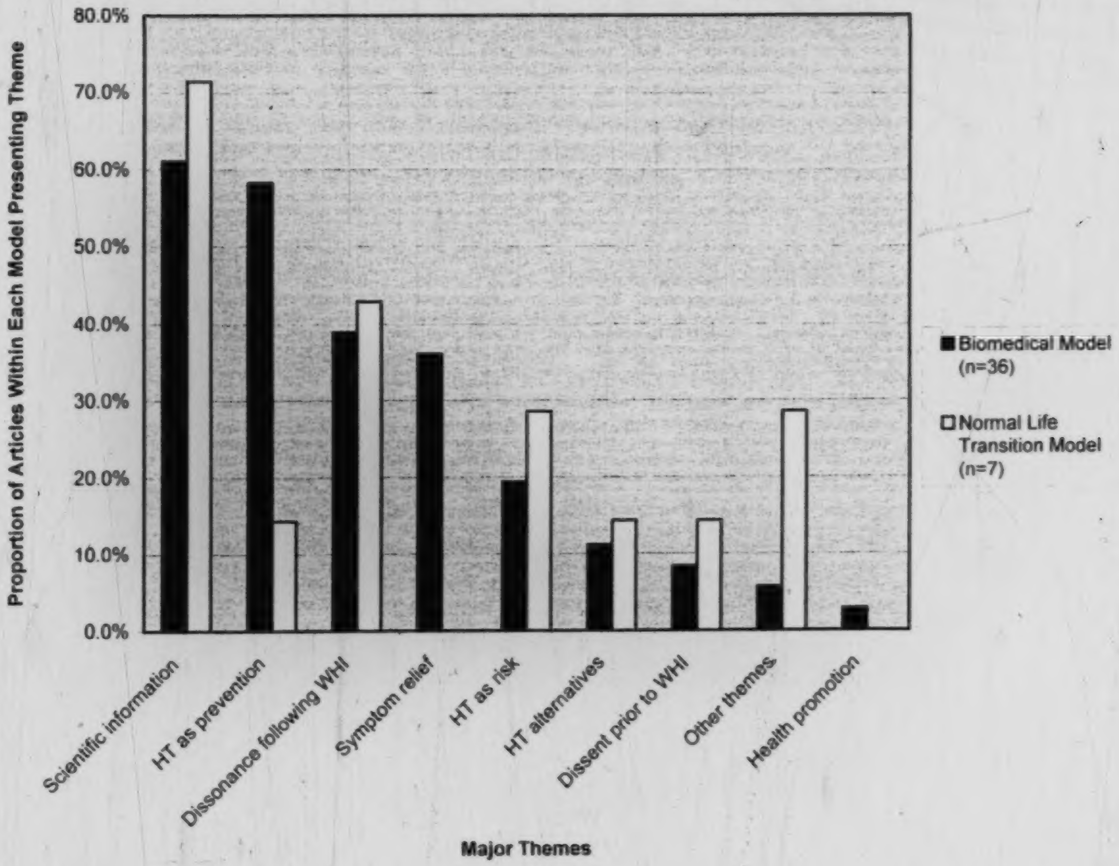
Despite the small number of articles demonstrating the normal life transition model, contrasting the proportion of articles which focused thematically on various themes demonstrated the following: a greater proportion of biomedical articles focused thematically on 'HT as prevention,' 'symptom relief,' and 'health promotion'; and a greater proportion of normal life transition articles focused thematically on 'scientific information,' 'dissonance following WHI,' 'HT as risk,' 'HT alternatives,' 'dissent prior to WHI,' and 'other themes' (see figure 2, page 134). A majority of articles from both the biomedical perspective (61.1%, n = 22) and from the normal life transition perspective (71.4%, n = 5) focused thematically on 'scientific information,' while 'health promotion' received little attention from either biomedical articles (2.8%, n = 1) or normal life transition articles (n = 0). While it might have been anticipated that a greater proportion of articles from the biomedical perspective (58.3%, n = 21) than the normal life transition perspective (14.3%, n = 1) focused on 'HT as prevention,' the lack of normal life transition articles focusing on 'symptom relief' (n = 0) is concerning. While there are consumer health books which discuss menopause as a normal life transition and also address the issue of symptom relief (Love 2003; Seaman 2003), the paucity of articles coming from this perspective and addressing this theme suggests that individuals who are not inclined to read a full length book, or seek out a concentrated source of information on the topic, will not be incidentally exposed to these ideas and will thus inevitably be restricted in their knowledge about this life stage.

4.3.8 Research Question 3: Summary of Results and Discussion

Although WHI findings impacted the diffusion of long-term preventative HT, the impact of this landmark study on the expression of the biomedical vs. normal life transition models within the literature is less certain. The biomedical paradigm dominated the random sample and, despite qualitative studies indicating women's interest in HT alternatives and their apprehension about the long-term implications of this therapy, medical and consumer articles expressed the two models in similar proportions. Results, therefore, appear to confirm the primary influence of the biomedical model on both medical and consumer publications. There were, however, interesting trends suggested by the data. The proportion of normal life transition articles increased following the publication of WHI results and, although all articles in the first three I-D stages were identified as representing the biomedical model, the proportion of articles that presented the normal life transition model increased in the implementation stage and then again increased in the confirmation stage. This suggests that, in at least a small proportion of the published literature, the WHI did impact basic conceptions of

Figure 2.

MAJOR THEMES IN BIOMEDICAL VS. NORMAL LIFE TRANSITION MODEL ARTICLES



women's health and well-being. In addition, despite the fact that majority of articles expressed the biomedical model, the proportion of articles expressing this model decreased and the proportion of articles expressing the normal life transition model increased when innovation attributes were presented in a negative manner. It is apparent that with the publication of WHI findings, physicians and women were provided with information that demanded the re-evaluation of long-term preventative HT; perhaps this information also opened the door for discussions of menopause within the context of women's normal lifespan development.

4.4 RESEARCH QUESTION 4: RESULTS AND DISCUSSION

Research Question 4: How was the medicalization of menopause expressed in the sample of medical and consumer articles?

Medicalization refers to the process that "occurs when a behaviour or problem is defined in medical terms and when medical treatments are seen as the appropriate solutions" (Hunter, O'Dea, and Britten 1997,1542). Beginning in the first decades of the twentieth century, middle-aged and older women were told that menopause was the start of a deficiency disease state similar to hypothyroidism or diabetes (Bell 1987) and that through the consumption of exogenous hormones a woman might find both relief from immediate symptoms and, in the long term, the primary prevention of disease. Over the last couple of decades, long-term preventative HT has been marketed to prescribing physicians and women on the basis of three major diseases that were linked, largely through observational studies and studies of surrogate risk factors, with lower estrogen levels: osteoporosis, heart disease, and Alzheimer's disease or cognitive decline (Meyer 2001). Despite the complex factors contributing to these diseases, they were "reclassified as diseases caused by menopause" (Love 2003, 4) and were presented to potential HT adopters as *symptoms* of hormone deficiency. Primary prevention of these diseases thus became the principal rationale for urging healthy menopausal or postmenopausal women to take hormones on a long-term basis (Palmlund 1997a). Through the sequential marketing of these supposed *symptoms* of estrogen deficiency, the medicalization of menopause became entrenched in both the medical system and in the minds of women.

The sampling frame chosen for this exploratory study spans an interesting period in the history of medicalization of women's health. Beginning in 1999, this sample incorporated a time period of unabashed enthusiasm for long-term HT and extended beyond the dissonance and uncertainty created by the publication of WHI findings in July 2002. Although many concerned critics of medicalization had highlighted the need for a large-scale, long-term randomized clinical trail of HT (Hemminki and Topo 1997; Meyer 2001; National Women's Health Network 2002), the results of the WHI study brought a variety of responses ranging from efforts to minimize the applicability of results (Reid 2003) to unequivocal acceptance of results: "there is more potential for harm than good in healthy postmenopausal women taking a combination of estrogen and progesterone to prevent chronic disease" (Day 2002, 361).

Given the time period of the sampling frame and the role of published literature in communicating to and between physician and consumer groups, it is valuable to consider how the medicalization of menopause was expressed in the random sample. In order to investigate this research question, the following variables and their relationships to other variables used in content analysis were explored: general discussion of *symptoms* within the sample and the assumption that menopause is linked with undesirable *symptoms*; specific discussion of osteoporosis, cardiac disease, and Alzheimer's disease or cognitive decline, as well as the role of HT in addressing these supposed indications of hormone deficiency; and the interplay of these variables within the different I-D stages of long-term preventative HT.

4.4.1 *Symptom* Discussion and the *Symptom*-Menopause Assumption

The outcome of medicalization is that patients are offered biomedical or technical solutions for processes that were once perceived as essentially 'normal' parts of everyday life (Nettleton 1995). Furthermore, the identification of a 'disease' is not simply based on biological occurrences, it is an expression of social expectation and social control (Nettleton 1995; White 2002). Rueda Marinez de Santos (1997) points out the social shaping of views within medical and consumer communities: "it is common to find in the medical press and mass media demographic projections showing the expected increase in numbers of postmenopausal women, and announcing an increasing public health problem for the future due to the anticipated growth in menopause-related diseases" (176). The pervasive, general discussions of undesirable menopausal *symptoms* and the assumption that these are likely to occur underlie the medicalization of this life stage and provide rationale for the promotion of long-term preventative HT.

In this random sample, 75.5% (n = 37) of articles discussed *symptoms* that have been associated with the menopause or postmenopausal years and, among this subset, 56.8% (n = 21) explicitly or implicitly presented the assumption that these years are associated with undesirable *symptoms*. In order to assess the expression of medicalization within the random sample, relationships between *symptom* discussion and *symptom* assumption and the following variables were explored: audience, WHI impact, projected tone, discussion of specific *symptoms*, and major themes.

4.4.1.1 *Symptom* Discussion and Audience

A higher than expected number of consumer articles discussed *symptoms* associated with menopause or postmenopause; thus, a statistically significant relationship was found between *symptom* discussion and audience ($\chi^2 = 10.960$, df = 1, $p < .001$). Among articles discussing *symptoms*, 54.1% (n = 20) were consumer articles; more importantly, however, was the finding that 100% (n = 20) of consumer articles discussed *symptoms*, whereas 58.6% (n = 17) of medical articles discussed *symptoms*. In addition, there was a higher frequency of consumer articles that presented an assumption of problematic *symptoms* during this life phase: 66.7% (n = 14) of articles communicating the *symptom* assumption were consumer articles and 33.3% (n = 7) were medical articles.

These results suggest that consumer articles in the random sample were an important means by which the relationship between menopause and its supposed sequelae were communicated to women. Since women have been identified as "slow actors who have to be taught the usefulness of HT" (Hemminki and Topo 1997, 154) one might hypothesize that the relationship between consumer articles and *symptoms* served to further the medicalization of menopause by reinforcing the *symptom*-menopause assumption.

Medicalization has also been described as occurring on three levels: conceptual, institutional and interactional (Bell 1990). This can be applied to menopause in the following way: menopause was medicalized on the conceptual level when it was defined as a deficiency disease and *symptoms* were attributed to hormone deficiency; once defined as a disease, medicalization occurred on an institutional level when, because of its definition as a disease, physicians gained the ability to diagnosis it and treat its *symptoms*; and finally, medicalization occurred on the interactional level when individual physicians began approaching menopause as a medical problem and women began seeking medical advice and help when they were in the menopause. The review of published literature, which indicated, "physicians valued HT more than women" (Hemminki and Topo 1997, 150) as well as the greater emphasis on *symptoms* within consumer articles suggests that this random sample expressed interplay at the interactional level of medicalization.

4.4.1.2 *Symptom* Discussion and Impact

A higher than expected proportion of post-WHI articles discussed menopausal *symptoms*; as a result, a relationship was found between *symptom* discussion and WHI impact ($\chi^2 = 4.306$, df = 1). Because the WHI specifically addressed questions related to osteoporosis, cardiac disease and dementia, diseases that had been constructed in part as outcomes of menopause, it is not surprising that there was an increased proportion of *symptom* discussion in post-WHI articles. A lower than expected proportion of WHI impacted articles, however, communicated the *symptom* assumption, thus indicating a significant relationship between *symptom* assumption and WHI impact ($\chi^2 = 5.553$, df = 1).

This latter result indicates that with the WHI initiated challenge to the assumed benefits of HT, the assumption that menopause is a deficiency disease that is associated with undesirable *symptoms* was communicated at a significantly reduced rate. Palmlund (1997) observed that menopause has been "constructed as risk" (87) and that risk, which is understood to be a threat to individuals or the things they value, is to some degree a result of one's culture. While it appears that with the publication of WHI results "the whole notion of the value of long-term hormonal therapy after menopause for prevention of the disease of aging has been called into question" (Love 2003, 6), results of this content analysis suggest that assumptions about menopause symptoms and disease risk that are made in our culture were also, perhaps inadvertently, called into question by WHI findings. This implication was further supported by the statistically significant relationship between *symptom* assumption and the relative advantage of long-term preventative HT ($\chi^2 = 6.217$, df = 1); articles communicating a *symptom* assumption included a higher than expected proportion of articles presenting the relative advantage of this therapy. Thus, with the publication of the WHI findings, which communicated HT's clear lack of relative advantage, expression of a *symptom* assumption in the literature also decreased.

4.4.1.3 *Symptom* Discussion and Projected Tone

A relationship was found between articles presenting the *symptom*-menopause assumption and projected tone ($\chi^2 = 7.819$, df = 1, $p < .005$): a higher than expected number of articles presenting this assumption communicated an overall positive view of long-term preventative HT. This suggests that with the assumption that this life phase is associated with *symptoms* comes a treatment imperative and thus the tendency to present HT in an overall positive light. The literature demonstrates that doctors who make the assumption that menopause is associated with undesirable sequelae, tend to promote the use of long-term HT even prior to the onset of *symptoms* (Winterich and Umberson 1999). This relationship found within the random sample of medical and consumer articles is a clear expression of the medicalization process whereby a problem is defined in medical terms and, as a result, medical intervention is seen in a positive light.

4.4.1.4 *Symptom* Discussion and Osteoporosis, Cardiac Disease, and Cognitive Decline

Within the group of articles that discussed *symptoms* (n = 37), 73% (n = 27) discussed osteoporosis and its relationship to menopause, 70.3% (n = 26) discussed the relationship between cardiac disease and menopause, and 40.5% (n = 15) discussed menopause and Alzheimer's disease or other manifestations of cognitive decline. Although the relationships between discussion of *symptoms* and any of these specific diseases for which HT was being recommended as a preventative therapy were not significant, frequencies do suggest the sequential medicalization of menopause as pointed out in the literature: osteoporosis was "practically identified as a symptom of menopause in the 1980s"(Worcester and Whatley 1992, 9); in the early 1990s the supposed cardio-protective qualities of estrogen were promoted (National Women's Health Network 2002); and in the mid to late 1990s a link was made between aging, dementia and hormonal changes following menopause and, as a result, HT began to be viewed as therapy that would protect women from Alzheimer's disease and cognitive decline (Beckmann 1997).

4.4.1.5 *Symptom* Discussion and Major Themes

Relationships were found between articles that discussed *symptoms* associated with the menopause or postmenopause and five major themes: ‘scientific information’ ($\chi^2 = 9.228$, df = 1, $p < .005$), ‘HT as risk’ ($\chi^2 = 21.925$, df = 1, $p < .001$), ‘symptom relief’ ($\chi^2 = 5.739$, df = 1), ‘HT as prevention’ ($\chi^2 = 9.510$, df = 1, $p < .005$), and ‘dissonance following WHI’ ($\chi^2 = 8.443$, df = 1, $p < .005$). A lower proportion of *symptom* discussing articles than expected focused thematically on ‘scientific information’ and ‘HT as risk’; a higher proportion of these articles than expected focused thematically on the latter three themes.

These results suggest that articles discussing *symptoms* were not exploring the entire scope of possible outcomes from the use of long-term HT; for example, there was less than expected thematic focus on HT as a real or potential risk to women’s health. Furthermore, there was a higher than expected focus on themes that fit the prevailing paradigm produced by the medicalization of menopause, that is, HT as a means of symptom relief or control and HT as a long-term preventative therapy. The higher than expected focus on ‘symptom relief’ and ‘HT as prevention’ may also be explained in part by the higher than expected focus on ‘dissonance following WHI’: the WHI raised serious questions about the use of HT and, as a result, it might be expected that articles focusing on the consequential dissonance might also focus on way in which HT was being used. The lower than expected focus on ‘scientific information’ raises concerns that articles discussing *symptoms* were functioning as channels for an ideological framework that assumed that the definition of menopause as a deficiency disease was an unassailable truth.

Although results were not statistically significant, it is interesting to note that while 66.7% (n = 14) of articles presenting the *symptom*-menopause assumption did not focus thematically on ‘dissonance following WHI,’ 62.5% (n = 10) of articles without this assumption did focus on this theme. This suggests that the WHI may have impacted the assumption that undesirable *symptoms* are a part of every woman’s menopause experience or perhaps impacted the medicalized perspective that tends to focus exclusively on physical manifestations.

4.4.1.6 Conclusion: *Symptom* Discussion

Although women are concerned about *symptoms* during menopause, pervasive discussion of undesirable menopause *symptoms* and the assumption that these are likely to occur validates the medicalization of menopause and provides justification for the promotion of long-term preventative HT to healthy midlife and older women. Three quarters of articles in the random sample discussed symptoms and diseases which have been associated with menopause, and among this subset more than half explicitly or implicitly expressed the assumption that menopause is associated with undesirable *symptoms*. A higher than expected proportion of consumer articles both discussed *symptoms* associated with menopause and presented the *symptom*-menopause assumption. This suggests that consumer articles may have played a role in shaping the information that women received about menopause and its supposed sequelae. A higher than expected number of post-WHI articles discussed menopausal *symptoms*; however, a lower than expected number of articles impacted by the WHI communicated to readers the *symptom*-menopause assumption. Results of this content analysis suggest that following the WHI's challenge of assumed HT benefits, the assumption that menopause is associated with undesirable *symptoms* was communicated at a significantly reduced rate. The relationship between *symptom* assumption articles and an overall positive view of long-term preventative HT is a manifestation of the medicalization process whereby a problem is defined in medical terms and, as a result, medical intervention is seen in a positive light

There was a lower than expected number of articles with thematic focus on 'HT as risk' and a greater than expected focus on 'symptom relief' and 'HT as prevention'; this suggests that articles discussing *symptoms* were not exploring the entire scope of possible outcomes from the use of long-term HT. The lower than expected thematic focus on 'scientific information' raises concerns that *symptom* discussing articles functioned as channels for an ideological framework that assumed a medicalized view of menopause.

4.4.2 Osteoporosis

Beginning of the 1980s and in the wake of conclusive evidence that estrogen users were more likely to be diagnosed with endometrial cancer, the preventative effects of estrogen on osteoporosis were aggressively marketed. By the 1990s, "the immediate response of the medical community to a diagnosis of osteoporosis or osteopenia was to put the patient on a hormone-therapy regimen" (Seaman 2003, 170). While hormones do play a role in this malady, questions have been raised about the way this condition is both defined and diagnosed, its relationship to actual fractures, and the precise role of hormones in dealing with this problem. Despite these questions, this condition has played a role in the medicalization of women's health and is now "practically identified as a symptom of menopause" (Worcester and Whatley 1992, 9).

Within the random sample, 55.1% (n = 272) of articles discussed osteoporosis and its relationship to menopause or postmenopause, 20.4% (n = 10) of sample did not discuss this condition, and 24.5% (n = 12) did not discuss *symptoms* at all. Almost three quarters of the articles (73%, n = 27) in the *symptom*-discussing group mentioned osteoporosis. In order to investigate the expression of medicalization within the random sample, relationships between articles discussing osteoporosis and other conditions associated with menopause, major themes, and the role of HT in dealing with osteoporosis were explored.

4.4.2.1 Osteoporosis and Interaction with Cardiac Disease and Cognitive Decline

A higher than expected proportion of articles discussing osteoporosis also discussed cardiac disease and its relationship to menopause or postmenopause ($\chi^2 = 16.577$, df = 1, $p < .001$): 88.9% (n = 24) of the articles relating to osteoporosis also discussed cardiac disease. Dementia or cognitive decline was discussed by 44.4% (n = 12) of articles discussing osteoporosis. Although this latter result was not statistically significant, results demonstrate that, relatively speaking, the relationship of menopause to osteoporosis and cardiac dysfunction is discussed to a greater degree in the literature than the relationship of menopause and cognitive decline. Since discussions of cognitive decline, particularly Alzheimer's disease, in older women appeared primarily in the latter half of the 1990s, this data provides evidence for the sequential advancement of *symptoms* and illnesses, which were used to medicalize this life stage and market HT.

4.4.2.2 Osteoporosis and Interaction with Cancer

Results demonstrate a significant relationship between articles discussing osteoporosis and articles noting breast cancer ($\chi^2 = 6.512$, df = 1); a relationship was also found between osteoporosis-related articles and discussions of colorectal cancer ($\chi^2 = 7.423$, df = 1). In both of these cases, higher than expected proportions of articles discussing the former, also discussed the latter. The relationship between exogenous hormones and cancer has been part of HT discussions for many years. Although Wilson (1966) assured women that "estrogen therapy, far from causing cancer, tends to prevent it" (15), studies in the mid-1970s found that estrogen could lead to endometrial cancer and, as a result, prescriptions for estrogen medication fell precipitously in the late 1970s (Love 2003). This complication of HT appeared to be rectified when estrogens were combined with an oral progestin, but concerns about cancer continued to resonate.

Although content analysis does not divulge the nature of the relationship between discussions of osteoporosis and breast or colorectal cancer, this finding does highlight the benefit and risk interplay that shaped HT discussions and that has been used strategically, on occasion, to maintain a medicalized view of menopause. Genazzani and Gambacciani (2001), for example, note incidentally that long-term compliance for the majority of women is "highly unsatisfactory" (S51) primarily because of the fear of cancer; yet, their article presents HT in an unconditionally positive light. These authors note that following menopause "endocrine and metabolic consequences of ovarian failure can jeopardize female health and quality of life" (S49); later in the article they summarize their solution to the problem by stating "today there is a large body of evidence to show that hormone replacement therapy can cure and even prevent all the symptoms related to estrogen deficiency" (S51). This example of HT benefit and risk presentation illustrates the presence of cancer-related discussion in the literature and the clear expression of a medicalized approach to menopause: menopause was defined as 'ovarian failure' and thus, without apparent attention to concerns about risk, the replacement of ovarian hormones became the correct solution.

4.4.2.3 Osteoporosis and Major Themes

The majority of articles discussing osteoporosis focused thematically on 'HT as prevention,' 'scientific information' and 'dissonance following WHI' (see table 9). The small proportion of articles with the themes 'HT alternatives' or 'health promotion' provides evidence for the medicalization of this stage of life.

Table 9. Thematic focus of articles discussing osteoporosis

Theme	Percentage of Articles Discussing Theme
HT as prevention	66.7% (n = 18)
Scientific information	59.3% (n = 16)
Dissonance following WHI	51.9% (n = 14)
Symptom relief	40.7% (n = 11)
Dissent prior to WHI	11.1% (n = 3)
HT as risk	11.1% (n = 3)
HT alternatives	11.1% (n = 3)
Other themes	7.4% (n = 2)
Health promotion	7.4% (n = 2)

While one might expect to receive a medicalized perspective from physicians who are within the medical system, the fact that other perspectives do not appear in the published literature suggests that neither doctors nor women are being made aware of the wider options for osteoporosis prevention and management.

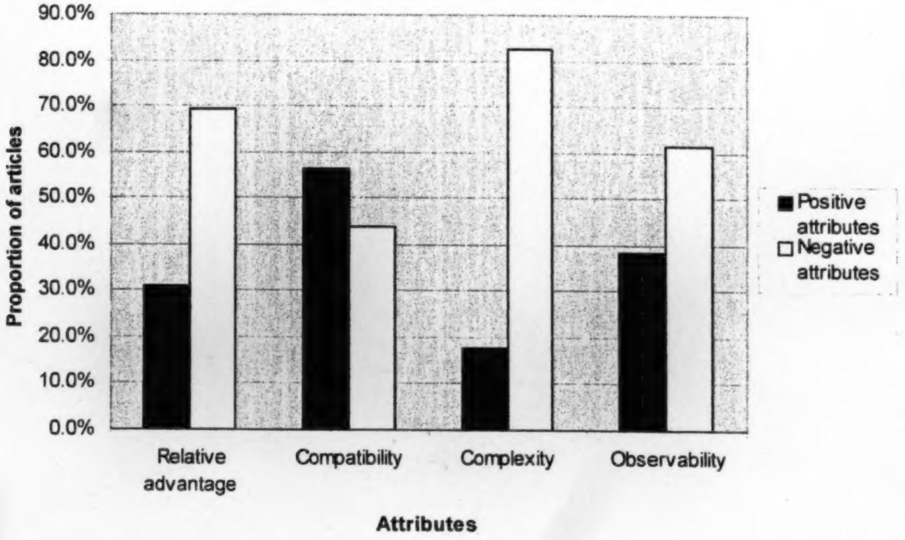
4.4.2.4 Osteoporosis and the Role of HT

All of the articles in the random sample that discussed the role of HT as it related to osteoporosis (n = 20) identified HT as being protective against this condition. Despite this endorsement of the osteo-protective qualities of HT, presentation of innovation attributes in articles discussing the role of HT were split between the positive promotion of attributes and the presentation of attributes in a negative light (see figure 3). Although a greater proportion of articles presented long-term HT as compatible with the beliefs, values and/or needs of adopters, the relative advantage, complexity and observability of this innovation were presented in a negative light. Because only three articles discussed the trialability of long-term HT, these data were not included in figure 3. The osteoporosis-menopause association and the role of HT has been a part of discussions related to women's health for many years. Indeed, this association has been discussed in both medical and lay texts since the 1960s (Topo 1997), and the threat of fractures has been a primary reason for the use of HT by many healthy women (Meyer 2001). Despite these facts, confusion about the value of HT was apparent even in articles discussing this condition.

With the recent recommendations of WHI researchers that positive outcomes in terms of fracture reduction were not sufficient to warrant long-term HT use (Cauley et al. 2003), the role of HT for long-term prevention has become ill advised (American College of Obstetricians and Gynecologists 2002; Food and Drug Administration 2003), thus suggesting the need to find ways to address fracture risk within a different context. There is some evidence of this happening in the post-WHI environment: Day (2002) points out that the risk of osteoporosis is related to peak bone mass and that "primary prevention of osteoporosis could

Figure 3.

ATTRIBUTES OF LONG-TERM PREVENTATIVE HT IN ARTICLES DISCUSSING HT'S ROLE IN OSTEOPOROSIS (n = 20)



therefore, consist of ensuring that teenagers and young adults maximize their bone mass with appropriate exercise and diet" (361); and many authors point to both the protective and therapeutic benefits of physical activity and diet, particularly vitamin D and calcium (Cousins and Edwards 2002; Love 2003; Meyer 2001; Seaman 2003).

The presentation of HT role in the random sample demonstrates the problems that arise when a life stage is medicalized. The definition of menopause as a deficiency disease required a medical solution. With the identification of long-term HT as a means of addressing osteoporosis, there has been a concomitant neglect of factors in the broader social and cultural environment that impact fracture risk. While medical and consumer articles presented HT as protective against osteoporosis, they also projected an ambivalent view of HT's attributes. Without directly addressing the complex factors which impact osteoporosis and fracture risk factors, these articles nonetheless appear to have affirmed Love's (2003) observation: "the story of osteoporosis . . . isn't about estrogen alone" (102).

4.4.2.5 Conclusion: Osteoporosis

Osteoporosis is widely regarded as a *symptom* of menopause and the promotion of long-term HT as a preventative measure against this condition has played a role in the medicalization of this life stage. Almost three quarters of the articles discussing menopause *symptoms* dealt with osteoporosis and a higher than expected proportion of articles discussing this malady also discussed cardiac disease and its relationship to menopause or postmenopause. Slightly less than half of the articles discussing osteoporosis also discussed cognitive decline in middle-aged and older women. This progression provided evidence of the sequential presentation of *symptoms* and illnesses that were used to market HT. The possible association between exogenous hormones and cancer has been a part of HT discussions for many years and this was suggested by the higher than expected number of articles discussing breast cancer and/or colorectal cancer in conjunction with osteoporosis. This finding highlighted the benefit and risk interplay that shapes debate about HT and influences the presentation of a medicalized approach to this life stage. The primary thematic focus of articles dealing with osteoporosis related to the preventative qualities of HT, scientific information, and post-WHI dissonance. The minimal focus on general health promotion or alternative approaches to this malady suggests that neither physicians nor women were being informed about the wider scope of options related to prevention and management, thus leaving the reader with a medicalized perspective of aging. While medical and consumer articles presented HT as protective against osteoporosis, they also projected a primarily negative view of HT's attributes, thus alluding to the complexity of factors influencing osteoporosis and the wider context within which long-term preventative HT must be considered.

4.4.3 Cardiac Disease

"The image of heart disease has undergone a transformation in recent years" (Love 2003, 118) as it has developed from being an exclusively male concern to being portrayed as a *symptom* of menopause and a spectre looming over midlife and older women. Despite the fact that Premarin never received FDA approval as a cardio-protective therapy, heart disease assumed a noteworthy role in the menopause medicalization process as the perceived protective qualities of HT against cardiac disease were, in the pre-WHI era, presumptively communicated to physicians and women through medical articles, health newsletters, health oriented internet sites, magazines, and newspapers (Seaman 2003).

Within the random sample, 53.1% (n = 26) articles mentioned heart disease and its relationship to menopause or postmenopause, and within the group discussing *symptoms*, 70.3% (n = 26) referred to cardiac dysfunction. In order to investigate the expression of medicalization within the random sample, relationships between articles discussing cardiac disease and other conditions associated with menopause, major themes, and the role of HT in dealing with this health problem were explored.

4.4.3.1 Cardiac Disease and Interaction with Osteoporosis and Cognitive Decline

Previous findings demonstrated the significant relationship between articles discussing osteoporosis and those discussing cardiac disease. From the converse perspective, results revealed that 92.3% (n= 24) of the articles discussing cardiac symptoms also discussed osteoporosis. It was also found that 46.2% (n = 12) of articles discussing heart disease addressed dementia or cognitive decline. These results provide further evidence suggesting that supposed *symptoms* of menopause were presented in medical and consumer publications in a sequential manner, which functioned to reinforce the perception of menopause as a deficiency disease with a medical solution.

4.4.3.2 Cardiac Disease and Interaction with Cancer

A higher than expected proportion of articles discussing cardiac symptoms and menopause (92.3%, n = 24) also mentioned breast cancer; thus a statistically significant relationship was found between these two variables ($\chi^2 = 10.013$, df = 1, $p < .005$). A higher than expected proportion of cardiac discussing articles also referred to colorectal cancer and so a relationship was also found between these variables ($\chi^2 = 8.479$, df = 1, $p < .005$). Because of the relationships found between osteoporosis discussion and discussion of cardiac disease, these relationships to cancers might be expected. Nonetheless, they serve to reinforce the fact that potential links between HT and cancer have been an important influence on the medicalization process. Fear of cancer, for example, has been identified as a foremost cause of controversy and a major impediment to achieving compliance with HT prescription (Pitkin 2002).

4.4.3.4 Cardiac Disease and Major Themes

With only slight variation, the major thematic focus of articles discussing cardiac disease as it related to menopause was similar to the focus of articles discussing osteoporosis and menopause (see table 10). The relationship between articles mentioning cardiac symptoms and the theme 'HT as prevention' was, however, significant ($\chi^2 = 6.728$, df = 1, $p < .001$): a higher than expected proportion of articles discussing heart disease focused on this theme. Prior to the release of WHI findings the cardio-protective qualities of HT were widely discussed and in the post-WHI era there was also much discussion of the previously assumed protective qualities; the significant relationship between articles discussing heart disease and the theme 'HT as prevention' might, therefore, have been anticipated.

Table 10. Thematic focus of articles discussing cardiac disease

Theme	Percentage of Articles Discussing Theme
HT as prevention	73.1% (n = 19) *
Scientific information	53.8% (n = 14)
Dissonance following WHI	53.8% (n = 14)
Symptom relief	42.3% (n = 11)
Dissent prior to WHI	11.5% (n = 3)
HT alternatives	11.5% (n = 3)
HT as risk	7.7% (n = 2)
Other themes	7.7% (n = 2)
Health promotion	7.7% (n = 2)

* Statistically significant relationship

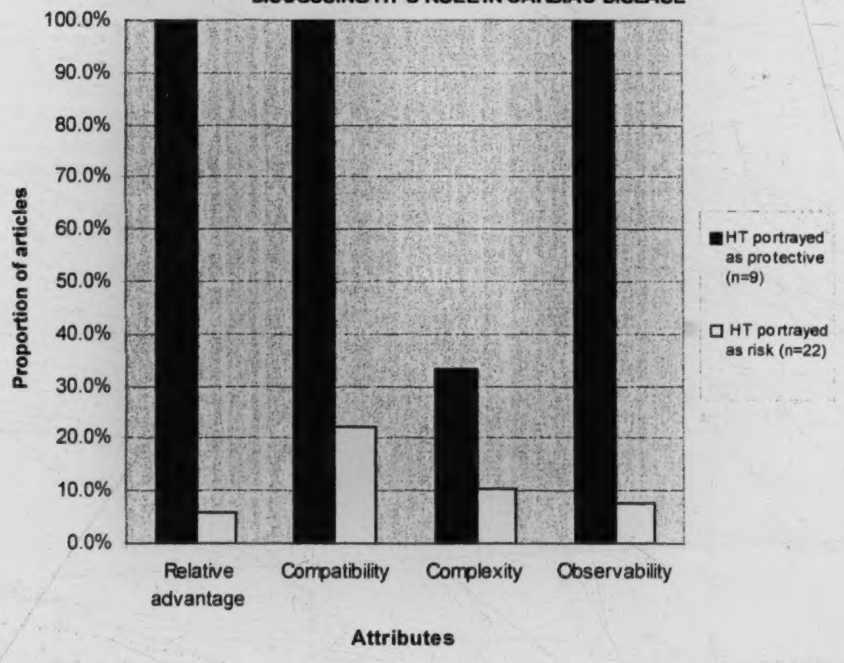
4.4.3.5 Cardiac Disease and the Role of HT

Among articles mentioning the role of HT in relation to heart disease, 29% (n = 9) noted that this therapy is protective, whereas 71% (n = 22) communicated that HT represents risk. The significant relationship between WHI impact and HT role ($\chi^2 = 20.080$, df = 1, $p < .001$) suggests that the WHI was a decisive factor in the determination of HT role as it relates to cardiac disease: a higher than expected number of articles that were not impacted by WHI findings presented HT as cardio-protective, while a higher than expected number that had been impacted by the WHI discussed HT as a cardiac risk factor. Furthermore, articles portraying HT role as protective against heart disease tended to depict the attributes of long-term HT in a positive light, whereas a noteworthy minority of those discussing the cardiac-related risk of HT presented the positive attributes of this therapy (see figure 4). The innovation attribute 'complexity' was an exception to this trend: the majority of all articles portrayed HT as more complex than simple. Only three articles discussed the trialability of long-term HT; therefore, these data were not included in figure 4. As might be expected, 100% (n = 7) of those articles portraying HT as cardio-protective and also discussing overall tone related to long-term HT expressed an overall positive view of HT; only 14.3% (n

= 2) of those articles presenting HT as a risk factor for heart disease had an overall positive view of HT. These findings demonstrated the WHI's influence on the I-D process of long-term preventative HT, but also, more importantly, expressed a primary dilemma of medicalization: when a problem is defined as a disease and the treatment imperative results in a medical solution, subsequent information-production and information-seeking on a research and individual level may be shaped by presumptions that are fortified by the medicalization process rather than by scientific discovery. Herrington and Howard (2003) highlighted this point when they noted that the clinical significance of randomized controlled trials prior to the WHI was "disregarded in lieu of the less credible evidence that fit the prevailing paradigm" (519).

Figure 4.

POSITIVE ATTRIBUTES OF LONG-TERM PREVENTATIVE HT IN ARTICLES DISCUSSING HT'S ROLE IN CARDIAC DISEASE



4.4.3.6 Conclusion: Cardiac Disease

Cardiac disease assumed an important role in the menopause medicalization process as the perceived protective qualities of HT against cardiac symptoms were, in the pre-WHI era, extensively communicated to physicians and women. Almost three quarters of *symptom*-related articles discussed the relationship of heart disease to menopause and a higher than expected proportion of articles discussing this disease also discussed breast and colorectal cancer. These findings highlight the important influence of discussions related to HT and cancer on the medicalization process. The literature provides evidence of this influence as well: fear of cancer was identified as the principal cause of controversy and a major barrier to achieving HT compliance among women. A higher proportion of articles discussing HT role in relation to heart disease communicated that HT represented a health risk. Among those articles not impacted by the WHI, however, a higher than expected number presented HT as cardio-protective while a higher than expected number of WHI impacted articles discussed HT as a cardiac risk factor. Furthermore, articles portraying the protective role of HT presented the innovation attributes of this therapy in an overwhelmingly positive light, whereas only a small proportion of those discussing the role of HT as risk presented the positive attributes of this therapy. The overall positive view of HT presented by the articles highlighting the cardio-protective characteristics of HT, and the overall negative view presented by articles presenting HT as risk demonstrated that the medicalization of menopause influenced the way information was presented in the sample.

4.4.4 Alzheimer's Disease or Cognitive Decline

Beginning in the mid 1990s the "biological plausibility" (National Women's Health Network 2002, 192) of estrogen therapy's positive impact on brain function received considerable attention in the medical and consumer press. There was a lack of consensus about the therapeutic and preventative value of HT both in the literature and in the random sample; 54.5% (n = 6) of the articles discussing cognition projected an overall positive view of long-term HT, whereas 45.5% (n = 5) projected an overall negative view. Nevertheless, the threat of memory loss or dementia and the promise of protection was, for many individual women, the deciding factor in trying HT: "many women feel they would do almost anything to avoid or rectify these problems" (Seaman 2003,195).

Within the group of *symptom*-related articles, 40.5% (n = 15) discussed Alzheimer's disease, other dementias, or cognitive decline, and the association of these conditions with menopause. In order to investigate the expression of menopause medicalization evident within the random sample, relationships between articles discussing dementia or cognitive decline and the following were explored: other conditions associated with menopause, major themes, and the role of HT in dealing with this health problem.

4.4.4.1 Cognitive Decline and Interaction with Osteoporosis and Cardiac Disease

The majority of articles discussing cognition-related symptoms and their connection to menopause also discussed the association of osteoporosis and cardiac disease with this life stage: 80% (n = 12) of articles related to mental functioning discussed both of these latter problems. This suggests that the majority of articles dealt with cognitive function within the framework of other illnesses that had been so closely associated with menopause that they were conceived by many women and professionals involved with women's health care to be *symptoms* of menopause (Love 2003; Worcester and Whatley 1992). This association with other maladies for which long-term preventative HT was being widely promoted, expressed a trend towards increasing medicalization as companies with economic interest in the use of HT sought to expand their markets (National Women's Health Network 2002).

4.4.4.2 Cognitive Decline and Interaction with Cancer

Breast cancer was mentioned by 80% (n = 12) of articles discussing dementia or cognitive function, 40% (n = 6) of these articles discussed uterine or endometrial cancer, and 53.3% (n = 8) referred to colorectal cancer. As has been noted in earlier discussion of results, these findings do not illuminate the nature of the association, but they do confirm the fact that at the same time as menopause was defined as a disease and HT was viewed as the solution for midlife women, cancer was also a noteworthy factor in the benefit and risk interplay that shaped HT discussions.

4.4.4.3 Cognitive Decline and Major Themes

A higher than expected proportion of articles discussing dementia or cognitive decline focused thematically on 'symptom relief' and therefore a relationship was found between these variables ($\chi^2 = 6.844$, df = 1, $p < .001$). A significant relationship was also found between these articles and thematic focus on 'HT as prevention' ($\chi^2 = 7.747$, df = 1, $p < .005$); a higher than expected proportion of articles discussing cognitive function focused on this theme. As with articles discussing osteoporosis and heart disease, cognition-related articles gave minimal attention to themes related to health promotion, alternatives to HT, or risk factors presented by HT (see table 11). With the significant focus on 'HT as prevention' and 'symptom relief' as well as the minimal focus on alternative approaches of health for midlife and older women, these results suggest that articles dealing with menopause and dementia or cognitive decline expressed a medicalized view of this life stage.

Table 11. Thematic focus of articles discussing dementia or cognitive decline

Theme	Percentage of Articles Discussing Theme
HT as prevention	86.7% (n = 13) *
Scientific information	66.7% (n = 10)
Symptom relief	60.0% (n = 9)*
Dissonance following WHI	40.0% (n = 6)
Dissent prior to WHI	13.3% (n = 2)
HT alternatives	6.7% (n = 1)
HT as risk	6.7% (n = 1)
Health promotion	6.7% (n = 1)
Other themes	0

* Statistically significant relationship

4.4.4.4 Cognitive Decline and the Role of HT

Only 14.3% (n = 7) of the random sample identified HT as a protective therapy against dementia or cognitive decline and 2% (n = 1) identified HT as a risk factor for these health problems; thus, only 16.3% (n = 8) of the entire sample addressed the issue of HT role in cognition. Within the group indicating that HT was protective, 28.6% (n = 2) had been impacted by WHI results; the single article depicting HT's role as risk in relation to cognitive function and dementias was impacted by WHI findings. All articles which portrayed HT as protective against dementia or cognitive decline portrayed the innovation attributes of long-term HT in a positive light, whereas the article noting HT's role as risk did not endorse any of the positive attributes of long-term HT. An exception to this was the innovation attribute 'complexity': only 20% (n = 1) of articles presenting the protective role of HT promoted the view that HT is less complex and therefore more adoptable. Given that the association between cognitive decline and estrogen deficiency is relatively recent, the first observational study suggesting this link was published in 1994 (Paganini-Hill and Henderson 1994), and that WHI results related to cognition were published in May 2003 (Rapp et al. 2003; Shumaker et al. 2003), the small number of articles addressing HT role and cognition might have been anticipated. Nonetheless, the small number of articles that identified a definitive role for HT in relation to dementia and cognition reinforced the claims of other authors who pointed to the generally ambiguous information on this topic in the literature (Love 2003; Meyer 2001).

4.4.4.5 Conclusion: Cognitive Decline

The lack of consensus about the therapeutic and/or preventative value of long-term HT for those suffering from Alzheimer's disease, other dementias, or cognitive decline was confirmed by the data analysis. These health concerns represent the latest addition to the list of maladies that long-term HT promised to alleviate, and a little less than half of the *symptom*-related articles in the sample discussed these health problems. The majority of articles discussing menopause and symptoms related to cognition or dementia also discussed the connection between this life stage and osteoporosis and/or cardiac disease. A noteworthy proportion of articles also discussed breast cancer, uterine or endometrial cancer, and colorectal cancer. The nature of this association is unclear; however, it is evident that, at the same time as HT was viewed as the solution for hormone deficiency during the menopause, cancer was a factor in the interplay of benefit and risk that shaped HT discussions. The medicalized view of menopause was suggested by thematic focus of articles: a higher than expected proportion of articles discussing dementia or cognitive decline focused thematically on 'symptom relief' and 'HT as prevention,' while only a very small proportion of articles discussed themes related to non-medical methods of dealing with problems during this life stage. Despite promotion of the protective benefit of HT for women concerned about maintaining optimal mental functioning, only a small proportion of the entire sample addressed the actual issue of HT role in cognition, and most of these articles identified HT as having a protective role. Since WHI results addressing cognition and dementia were not published until May 2003, it is likely that specific results dealing with these *symptoms* did not greatly impact discussion of this topic in the random sample.

4.4.5 Innovation-Decision Stages and Menopause *Symptoms*

The role of *symptom* discussion within the literature, as it is represented in different I-D stages of long-term preventative HT, allows an exploration of the expression of medicalization within the sample from a chronological perspective. Medicalization is, after all, a process: a problem is defined as medical and then medical solutions are implemented. In addition, it is a process that encourages increasing reliance on medical experts (Nettleton 1995), and it is a process that commonly reinforces itself because of the need to deal with iatrogenic effects of medical treatment (Meyer 2001). In order to explore the expression of medicalization as it relates to the I-D process of long-term HT, the relationships of the I-D stages and variables related to *symptom* discussion were investigated.

4.4.5.1 Knowledge Acquisition Stage and *Symptoms*

All articles in the KA stage discussed *symptoms* and all KA articles discussing the role of HT presented this therapy as being protective against osteoporosis, heart disease, and cognitive decline. Since most KA articles (75%, n = 3) were in the consumer literature and women are more likely to use HT when symptoms are present (Hunter, O'Dea, and Britten 1997), it is not surprising that KA stage articles presented information about *symptoms*. This is not unlike articles in other stages of the I-D process: 73.3 % (n = 33) of the non-KA articles also discussed *symptoms*. All KA articles presented the assumption that the menopause or postmenopause period is associated with problematic *symptoms*; 51.5% (n = 17) of the non-KA articles made a *symptom* assumption. Because specific maladies, particularly osteoporosis, cardiac disease, and cognitive decline, were marketed to physicians and women as *symptoms* of the menopausal and postmenopausal time period (Kaufert and Lock 1997; Meyer 2001; Palmlund 1997a), it is interesting to note discussion of these three health problems within the I-D stages of long-term HT: 75% (n = 3) of KA articles discussed or mentioned osteoporosis and/or cardiac disease, while 100% (n = 4) discussed cognitive symptoms. Although the number of actual articles was small, these results reflected the evolution of menopause medicalization and HT marketing through the 1990s. While HT for the prevention of osteoporosis and cardiac dysfunction was marketed to potential adopters beginning in the late 1980s and early 1990s respectively, it was not until the late 1990s that the link between aging, dementia and hormonal changes following menopause began to be viewed as "logical and compelling" (Beckmann 1997, 295). These results, therefore, suggest that since cognitive decline was a recent addition to the justification for widespread use of HT for disease prevention, it would inevitably be a focus for articles dealing with knowledge acquisition. It is interesting to note that non-KA articles demonstrated a reverse trend: 72.7% (n = 24) non-KA articles discussed osteoporosis, 69.7% (n = 23) mentioned cardiac disease, and 33.3% (n = 11) referred to cognitive decline or dementia. These results may suggest the sequential maturity of these three major reasons used to market HT as a means of long-term disease prevention.

4.4.5.2 Persuasion Stage and *Symptoms*

All articles expressing characteristics of the persuasion stage discussed or mentioned *symptoms*; *symptoms* were noted in the majority (71.4%, n = 30) of non-persuasion stage articles as well. A greater proportion of persuasion articles, however, explicitly or implicitly presented the assumption that the menopause is associated with undesirable *symptoms*: 100% (n = 7) of the persuasion articles presented this assumption, whereas the *symptom* assumption was presented by 46.7% (n = 14) of non-persuasion articles. These results suggest that the presentation of *symptoms* as an integral part of the menopause experience is fundamental to the persuasion stage in which "the individual becomes more psychologically involved with the innovation . . . [and] may mentally apply the new idea to his or her present or anticipated future situation" (Rogers 1995, 168). The presentation of menopause *symptoms* as an inherent part of this life stage also suggests that the persuasion stage, as illustrated by articles in the random sample, expressed the medicalization of menopause. Articles in this stage of the I-D process confirmed the status of menopause as a deficiency disease and reinforced the need for a medical solution.

Osteoporosis, cardiac disease, and cognitive decline have been sequentially marketed to women and physicians as *symptoms* or sequelae of the postmenopausal period. In the random sample, 57.1% (n = 4) of the articles with characteristics of the persuasion stage discussed osteoporosis, 71.4% (n = 5) referred to cardiac disease, and 85.7% (n = 6) mentioned cognitive decline or dementia. Although the number of articles is small, the sample demonstrated an increasing proportion of articles discussing these maladies. This increase paralleled the marketing of long-term preventative HT that is detailed in the literature review. Non-persuasion stage articles demonstrated the same trend in reverse: 76.7% (n = 23) discussed osteoporosis, 70% (n = 21) mentioned cardiac disease, and 30% (n = 9) discussed cognitive decline. These results indicate that during the time period from which the sample was drawn, there was greater persuasive effort focused on the most recently discovered indication for long-term HT, whereas during other I-D stages, established indications for HT received more focused attention.

Both persuasion and non-persuasion stage articles identified HT as being protective against osteoporosis. Within the group of persuasion articles noting HT's role related to cardiac disease, 80% (n = 4) presented HT as being protective; 19.2% (n = 5) of non-persuasion stage articles identified HT's role as being protective against cardiac disease. Only three persuasion stage articles discussed the relationship between HT role and cognitive decline, and all presented HT as being protective. Among those non-persuasion stage articles that noted the role of HT with regard to cognitive decline and dementia, 80% (n = 4) presented HT as having a protective role.

The presentation of *symptoms* which might be ameliorated by HT represents a well-established marketing approach (Wilson 1966) and, in North America, *symptom* avoidance was so successfully marketed in the pre-WHI environment that "many women [were] prescribed hormones even before symptoms start[ed]" (Cousins and Edwards 2002, 328). Research suggests that "women generally view the menopause as a natural process, which does not require medication unless severe symptoms are present" (Walter and Britten 2002, 580) and yet, even for the woman who is ambivalent about medication, the threat of debilitating symptoms and disease may be persuasive enough to motivate consent to HT (Winterich and Umberson 1999). Persuasion stage articles found in the random sample clearly manifested a medicalized view of menopause: they focused on *symptoms* and the physical aspects of this phase of life, and they communicated the assumption that menopausal women will be afflicted with undesirable *symptoms*.

4.4.5.3 Decision and *Symptoms*

While 74.5% (n = 35) of the non-decision stage articles discussed *symptoms* and 54.3% (n = 19) demonstrated the assumption that menopause or postmenopause is associated with undesirable *symptoms*, 100% (n = 2) of the decision stage articles discussed *symptoms* and expressed the assumption that menopause and undesirable *symptoms* are associated. Both of the decision stage articles discussed osteoporosis, cardiac problems, and cognitive decline as *symptoms* of menopause, whereas these maladies were discussed by 71.4% (n = 25), 68.6% (n = 24), and 37.1% (n = 13), respectively, of the non-decision stage articles.

Articles that discussed the role of HT in osteoporosis presented HT as playing a protective role regardless of which I-D stage they were in. All of the decision stage articles, however, presented HT as being protective against cardiac disease, whereas only 24.1% (n = 7) of non-decision stage articles presented HT as protective against this ailment. Only 8 of the 49 articles in the random sample discussed the role of HT in cognition. One of the decision stage articles addressed this point and presented the view that HT protects users from cognitive decline; of the 7 non-decision stage articles that discussed the role of HT in cognition, 85.7% (n = 6) presented HT as being protective.

These data suggest that symptoms or the threat of disease were an important part of communicating decision-oriented information. They also suggest that a medicalized view of menopause was an integral part of decision stage articles in the random sample. This point of view was also found in the literature review: doctors were more likely than women to conceptualize menopause within a medicalized framework and they actively encouraged patients to make an adoption decision and take long-term HT for the prevention of symptoms and illness (Hunter, O'Dea, and Britten 1997; Topo, Hemminki, and Uutela 1993; Winterich and Umberson 1999).

4.4.5.4 Implementation and *Symptoms*

A lower number of implementation articles than expected discussed *symptoms* generally associated with the menopause or postmenopausal years; thus, the relationship between implementation stage articles and *symptom* discussion was statistically significant ($\chi^2 = 11.588$, df = 1). The majority of non-implementation stage articles (96%, n = 24) discussed or mentioned *symptoms*. Among those implementation articles that mentioned *symptoms*, 69.2% (n = 9) explicitly or implicitly presented the assumption that menopause is associated with undesirable *symptoms*. On the other hand, 76.9% (n = 10) stated or provided data indicating that not all women experience troublesome *symptoms* during menopause or the postmenopause. These results indicate the ambiguity of information communicated to doctors and women during the implementation stage of long-term HT; despite the explicit or implicit assumption of problematic *symptoms* for middle-aged and older women, articles provided data demonstrating that not all women suffer from *symptoms* and that long-term HT may not be the optimal solution for healthy midlife women.

The majority of implementation stage articles referring to *symptoms* discussed osteoporosis (92.3%, n = 12) and cardiac disease (69.2%, n = 9) as *symptoms* or potential *symptoms* of this life phase. Only 30.8% (n = 4) of articles discussed or mentioned dementia or cognitive decline. This may be an indication of the relative newness of the association between Alzheimer's disease or cognitive decline and estrogen deficiency (Paganini-Hill and Henderson 1994; Yaffe et al. 1998). Among implementation articles discussing the role of HT, this therapy was viewed as playing a protective role against osteoporosis (100%, n = 10) and cognitive dysfunction (100%, n = 4); 46.2% (n =6) presented HT as having a protective impact on cardiac disease.

Within this random sample, implementation articles demonstrated a departure from articles having characteristics of earlier I-D stages: there was less discussion of *symptoms* and, as discussed in the context of the first research question, a higher than expected thematic focus on 'HT as risk.' This suggests that at this post-adoption I-D stage, as articles began to address challenges relating to how HT was used, how it worked in practice, operational problems that may be encountered and how they might be solved, there was also implicit challenge to the purely medicalized view of menopause. If, after all, long-term HT did not deliver the promised benefits to women, then the basic assumption that midlife and older women suffer from a deficiency disease would become questionable.

4.4.5.5 Confirmation and *Symptoms*

Symptoms associated with menopause or postmenopause were mentioned in 74.3% (n = 26) of confirmation stage articles and 42.3% (n = 11) of these articles presented the assumption that this life stage is associated with undesirable *symptoms*. A smaller number of confirmation stage articles than expected presented this assumption, and thus a statistically significant relationship was found between confirmation stage articles and the *symptom*-menopause assumption ($\chi^2 = 7.439$, df = 1, $p < .005$).

The majority of confirmation stage articles that referred to menopausal *symptoms* discussed osteoporosis (76.9%, n = 20) and cardiac disease (76.9%, n = 20), but only a minority discussed cognitive dysfunction (38.5%, n = 10). As was noted for implementation stage articles, this may well be an indication of the relative newness of the idea that Alzheimer's disease and cognitive decline in older women may be related to menopause and that HT provides a solution for this *symptom* of estrogen deficiency (Paganini-Hill and Henderson 1994; Yaffe et al. 1998). In addition, WHI results linking HT to "a small increased risk of clinically meaningful cognitive decline" (Rapp et al. 2003, 2663) and increased "risk for probable dementia in postmenopausal women aged 65 years or older" (Shumaker et al. 2003, 2651) were published relatively recently, and so it is not surprising that cognition received less intense attention in the random sample and particularly in confirmation stage articles.

Among confirmation articles discussing the role of HT, this therapy was viewed as playing a protective role against osteoporosis (100%, n = 14) and cognitive decline (80%, n = 4). Only 12.5% (n =3) presented HT as having a protective impact on cardiac disease. This represents a noteworthy departure from previous I-D stages, in which HT was portrayed as having a primarily protective role with regard to cardiac dysfunction, and it indicates that articles were impacted by the information arising from the WHI study. This also suggests that published literature, which shows a clear trend in the way it presents critical information or answers decisive questions, will influence the I-D process and ultimately may have an impact on the medicalization of menopause.

4.4.5.6 Conclusion: Innovation-Decision Stages and Menopause *Symptoms*

Exploration of variables within the context of I-D stages demonstrated that medicalization was expressed in the random sample as a progressive phenomenon that manifested itself differently in the first three I-D stages than the last two. All articles in the KA, persuasion and decision stages discussed *symptoms* and presented the assumption that these will afflict menopausal women to one degree or another. Articles thus confirmed the status of menopause as a deficiency disease that causes undesirable sequelae, and reinforced the need for a medical solution. Knowledge acquisition and persuasion articles also presented an increasing proportion of articles discussing osteoporosis, cardiac disease and cognitive decline, thus suggesting that communication focused on the most recently determined indications for long-term preventative HT. Results of content analysis suggest that in all three of the initial I-D stages, symptoms or the threat of disease were an important part of the information that was communicated and HT was presented as a solution to menopausal problems. Articles thus expressed a medicalized view of menopause and were biased towards presenting information that would stimulate adoption of long-term preventative HT.

There was less discussion of *symptoms* in implementation articles than was expected and presented information was ambiguous: despite the explicit or implicit assumption of problematic *symptoms* for menopausal and/or postmenopausal women, articles provided data demonstrating that not all women suffer from *symptoms*. Results suggest that as articles at this stage in the I-D process discussed post-adoption problems related to HT use, they opened this therapy up to questions about its efficacy, and, perhaps inadvertently, challenged a purely medicalized view of menopause. A smaller number of confirmation stage articles than expected presented the *symptom*-menopause assumption and, although HT was presented as having a protective role against osteoporosis and cognitive decline, a minority of articles portrayed HT as having a protective impact on cardiac disease. This suggests that confirmation stage articles were impacted by WHI results and that published literature played a role in the I-D process and, ultimately, may have had an impact on the medicalization of menopause.

4.4.6 Research Question 4: Summary of Results and Discussion

The medicalization of menopause began early in the twentieth century and, over the years, menopause has come to be accepted by many physicians and women as a deficiency disease, which impacts all midlife and older women and which can be alleviated through exogenous hormones. Long-term preventative HT has been promoted to potential adopters primarily on the basis of three disease processes: osteoporosis, cardiac disease, and Alzheimer's disease or cognitive decline. Based on a medicalized view of menopause, these diseases have come to be viewed as *symptoms* of hormone deficiency and thus they have provided the primary rationale for the long-term use of HT by healthy menopausal or postmenopausal women.

Using content analysis, this study explored the medicalization of menopause as it was expressed within the random sample of medical and consumer publications. In order to study this phenomenon, the following variables and their relationships were examined: the general discussion of *symptoms* within the sample and the assumption that menopause is linked with undesirable *symptoms*; specific discussion of osteoporosis, cardiac disease, and Alzheimer's disease or cognitive decline, as well as the role of HT in addressing these supposed outcomes of hormone deficiency; and the interplay of these variables within the different I-D stages of long-term preventative HT.

Three quarters of the random sample discussed symptoms and diseases that have been associated with menopause, and more than half of the *symptom*-discussing group explicitly or implicitly presented the assumption that the menopausal or postmenopausal years are associated with undesirable *symptoms*. *Symptoms* were discussed and the *symptom*-menopause assumption made by a higher than expected proportion of consumer articles, thus suggesting that consumer articles play a role in shaping the information that women receive about menopause and reinforcing a medicalized view of this life stage. Since medicalization occurs on three levels, conceptual, institutional and interactional (Bell 1990), the greater emphasis on *symptoms* within consumer articles suggests that this sample expressed interplay at the interactional level.

Although a higher than expected proportion of post-WHI articles discussed menopausal *symptoms*, a lower than expected number of these articles communicated the *symptom*-menopause assumption. In addition, a significant relationship was found between articles expressing a *symptom* assumption and the innovation attribute, relative advantage. This suggests that the WHI, by confronting the assumed benefits of long-term preventative HT and its relative advantage, impacted expression of the *symptom*-menopause assumption. The relationship between *symptom* assumption articles and an overall positive view of HT was an expression of the medicalization process whereby menopause was defined in medical terms and, as a result, alleviation of menopause-caused deficiency became an imperative. Articles discussing *symptoms* had a lower than expected thematic focus on 'HT as risk' and 'scientific information,' and a greater than expected focus on 'symptom relief' and 'HT as prevention'; these results also expressed a medicalized view of this life stage. Articles discussing *symptoms* did not appear to be discussing the entire scope of possible outcomes from long-term HT use; rather, the results suggest that these articles functioned as channels for an ideological framework that assumed a medicalized view of menopause.

Osteoporosis was so effectively marketed to women and physicians that it came to be identified not as a risk factor for fracture, but as a disease itself and, more importantly, a *symptom* of estrogen deficiency. Almost three quarters of the articles discussing menopause *symptoms* referred to osteoporosis and a higher than expected proportion of articles discussing this malady also discussed cardiac disease. Less than half of the osteoporosis-related articles mentioned dementia or cognitive decline. This progression provided evidence of the sequential presentation of *symptoms* and illnesses that characterized the medicalization of menopause. Discussions of a possible association between exogenous hormones and cancer have long been a part of HT-related discussions; the relationships found between osteoporosis discussion and breast cancer and/or colorectal cancer highlighted the benefit and risk interplay that shaped debate about HT and influenced the presentation of a medicalized approach to this life stage. The thematic focus of osteoporosis-related articles within the sample suggested a lack of appreciation for diverse approaches to this life stage; neither physicians nor women were being informed about the wider scope of options related to prevention and management. In contrast to the osteo-protective role that all articles communicated, innovation attributes were presented in a primarily negative light. These results suggest that complex factors influence osteoporosis management and the view of long-term preventative HT.

In the pre-WHI environment, the supposed cardio-protective qualities of long-term HT were extensively communicated to potential adopters. In the random sample, almost three quarters of the *symptom*-related articles discussed heart disease and its relationship to menopause. The relationship between HT role and WHI impact suggests that the WHI was a decisive factor in the determination of HT role as it related to heart disease: among those articles not impacted by the WHI a higher than expected number presented HT as cardio-protective, while among WHI impacted articles a higher than expected number of articles discussed HT as a cardiac risk factor. Innovation attributes were presented in a positive light by articles portraying the protective role of HT, whereas only a small number of articles discussing the role of HT as risk presented positive attributes of HT. Furthermore, articles highlighting the cardio-protective characteristics of HT presented this therapy in an overall positive light, while articles presenting HT as risk communicated an overall negative perspective. These results demonstrate that the medicalized view of menopause influenced and shaped the way information was presented in the random sample.

Alzheimer's disease, other dementias and cognitive decline represented the latest addition to the list of health problems that long-term HT promised to alleviate. Slightly less than half of the *symptom*-related articles in the random sample discussed the relationship between cognitive *symptoms* and menopause. The majority of articles mentioning cognition did, however, also discuss osteoporosis and/or cardiac disease. This indicates that the relationship between cognition and menopause was primarily presented to readers within the context of other maladies that many considered to be *symptoms* of estrogen deficiency and it suggests an increasing trend towards the medicalization of women's health and the aging process. A noteworthy proportion of articles discussing cognitive decline or dementia also discussed breast, uterine or endometrial, and colorectal cancer, thus making it evident that at the same time as HT was being viewed as the potential solution for health problems, cancer was an important factor in the interplay of benefit and risk that shaped HT discussions. Thematic focus of cognition-related articles suggested a medicalized view of menopause: a higher than expected proportion of articles focused thematically on 'symptom relief' and 'HT as prevention,' while only a very small proportion discussed themes related to non-medical methods of dealing with the menopause. Only a small proportion of the entire sample addressed the issue of HT role in cognition and most of these articles identified HT as having a protective role. WHI results addressing dementia and cognition were published in May 2003 and it is therefore likely that these results, which demonstrated that HT represents a small degree of risk for cognitive function, had minimal impact on the information presented in the random sample.

Exploration of the interaction between articles' I-D stage and *symptom* discussion demonstrated that medicalization was expressed in the random sample as a progressive phenomenon that manifested itself differently throughout the I-D process. All articles in the KA, persuasion and decision stages discussed *symptoms* and communicated the *symptom*-menopause assumption. Discussions of osteoporosis, cardiac disease and cognitive functioning reflected the menopause medicalization process; for example, cognitive decline was the most recent addition to the list of maladies justifying long-term HT and all KA articles discussed this newly discovered symptom. Results suggest that the presentation of *symptoms* as an integral part of the menopause experience was central to persuasion stage articles since the function of articles in this I-D stage was to convey the idea that menopause is a deficiency disease that causes undesirable sequelae and thus requires a medical solution. Symptoms or the threat of disease were also important in the communication of decision-oriented information. Content analysis suggested that all three of the initial I-D stages expressed a medicalized view of menopause and were biased towards presenting information that would stimulate HT adoption.

Symptoms were discussed in a lower number of implementation articles than expected and readers were presented with ambiguous information about the relationship between menopause and symptoms. Articles at this stage in the I-D process discussed post-adoption problems and questions related to HT use and thus they opened this therapy to questions about efficacy, and, perhaps inadvertently, challenged the medicalized view of menopause presented by articles in previous I-D stages.

The assumption that menopause is accompanied by undesirable *symptoms* was expressed by a smaller number of confirmation stage articles than expected and, among those confirmation stage articles discussing the role of HT, only a minority of articles portrayed HT as having a protective impact on cardiac disease. These results indicated that confirmation stage articles were impacted by WHI findings and that published articles not only played a role in the I-D process but also may have impacted the medicalization of this life stage.

While the random sample clearly expressed the medicalization of menopause through the relationships demonstrated by content analysis, it is important to note that dissonance created by the WHI does not indicate demedicalization of menopause; rather, it indicates a period of controversy with an as yet undetermined outcome. For demedicalization to occur, menopause must no longer be defined in medical terms and medical treatments must no longer be seen as the appropriate solution for this life stage (Bell 1990).

4.5 RESEARCH QUESTION 5: RESULTS AND DISCUSSION

Research Question 5: Given the acknowledged impact of industry in medicine, how did industry influence articles in the sample?

Although there is profound evidence of industry influence in medicine (Palmlund 1997a; Nathan and Weatherall 1999; Bekelman, Li, and Gross 2003; Davidoff et al. 2001; Bodenheimer 2000; Djulbegovic et al. 2000; Lexchin et al. 2003), this was an area of limited inquiry in the exploratory study due to the constraints of the sampling method. Since the sample was chosen primarily from articles available online, assessment of the general milieu of publications (i.e., advertisements, industry funded supplements, or special issues that receive industry funding) was limited. Even in those periodicals accessed in paper format, assessment of industry presence was limited since most medical libraries remove advertising when journals are bound (Palmlund 1997a). In an unbound September 2002 issue of a Canadian medical journal, for example, there were nine full-page advertisements for HT which, when bound, would be removed.

Disclosure of financial ties, particularly by authors who have ties with companies making products discussed in submitted papers, has been an issue of concern for many years; in 1984, for example, the *NEJM* became the first major medical journal to institute a disclosure policy for authors (Angell 2000). The need for such policies has increased dramatically in the last number of year as money for clinical trials has increasingly come from private rather than public sources (Bodenheimer 2000). Although many journals now do require disclosure of financial ties with and sponsorship by industry, the policies of journals "vary significantly in their requirements to disclose financial interests" (Krimsky and Rothenberg 1998, 226) and these ties are frequently so extensive that full disclosure in the published article is not possible (Angell 2000). More important, there is evidence that many academics and researchers have ties to industry that are not apparent in published articles. A systematic review of various medical sources, for example, reported the following list of financial transactions between scientific investigators and industry: the giving of research-related gifts such as biomaterials or discretionary funds, paid speaking engagements, positions on boards, and consulting arrangements (Bekelman, Li, and Gross 2003). Influence on lay magazines by industry is also pervasive but, for the most part, it is even less apparent. Consumer magazines may have clearly marked advertising supplements, but the powerful influence of advertisers on editorial content is only evident to those involved in upper management (Steinem 1994).

For the purposes of this study, indications of industry involvement were drawn from printed disclaimers regarding sponsorship of research or the declared industry ties of authors. Although it was anticipated that not all articles in the random sample would clearly indicate industry involvement, only a minority of articles was identified as either having received direct research funding or having stated author involvement in industry (16.3%, n = 8), or as having no competing interests at all (2%, n = 1). In the majority of articles (81.6%, n = 40), there was no direct indication of industry funding or the lack thereof. Because of the very small proportion of articles that definitively declared independence from commercial funding, the latter two groups of articles were combined for the purposes of statistical analysis. In order to investigate evidence of industry's influence on the articles in the random sample, industry sponsorship was explored as it related to audience, publication and article type, WHI impact, projected tone, and major themes.

4.5.1 Industry and Audience

The majority (87.5%, n = 7) of articles indicating ties to industry were found in publications intended for medical audiences; only 12.5% (n = 1) were found in consumer publications. Within the total number of medical articles, 24.1% (n = 7) indicated ties to industry, while 5% (n = 1) of all the consumer articles specified industry involvement. It is important to note that the single consumer article indicating ties to industry was actually a "special advertising educational section" within a consumer health magazine (The Hormone Foundation 2000). This 'article' was indexed within the database from which it was retrieved as a legitimate article and a careful reading of the database-supplied copy did not reveal the article's relationship with 'The Hormone Foundation' and Wyeth-Ayerst Laboratories. Later, when a different source was found and a 'portable document format' (pdf) version printed out of an interest to contrast the presentation of the database-supplied copy and the original presentation of the article, it was discovered that what had appeared to be a genuine article and had read like a scientifically based, consumer overview of HT use, was actually an advertising feature with sponsorship from Wyeth-Ayerst noted in the proverbial fine print. Although the pdf version of the article is boldly prefaced by a 'personal' message from the president of 'The Hormone Foundation,' the association between pharmaceutical companies and non-profit organizations, which is elucidated by the National Women's Health Network, eloquently described this 'article' found within the random sample: "[drug companies] seek out nonprofit groups working on women's health and offer them money to conduct educational campaigns that promote the need for their products" (National Women's Health Network 2002, 15).

Findings suggest that consumer articles do not usually communicate information about industry influence on specific articles in a way that would be apparent to readers. A factor in this was that industry ties were primarily communicated in the random sample through the declared affiliations and funding of authors. The roles of consumer article authors in this random sample, however, were less likely to be identified than the roles of medical article authors: 27.3% (n = 6) of articles with identified authors were in consumer publications, whereas 72.7% (n = 16) were in peer reviewed, medical publications. In the group of articles indicating industry ties, 87.5% (n = 7) identified author role and in 12.5% (n = 1) author role was not identified. This contrasts with the proportion of articles within the entire random sample that identified author role: 44.9% (n = 22) of the random sample indicated author role, whereas 55.1% (n = 27) did not identify author role. This suggests that identification of authors' roles and affiliations plays a primary role in communicating industry ties.

Furthermore, a study that investigated the U.S. news-media coverage of three medications reported: "news- stories about medications may include inadequate or incomplete information about . . . the financial ties between study groups or experts and pharmaceutical manufacturers" (Moynihan et al. 2000, 1645). It therefore appears that consumers are neither informed about the potential commercial influence on the article they are reading, nor are they being educated about possible conflicts of interest related to medical treatments that are being discussed and reviewed.

4.5.2 Industry and Publication and Article Type

The majority (75%, n = 6) of articles indicating that author(s) had industry ties or that the reported study received research support from industry were found in the peer reviewed medical literature. Only 12.5% (n = 1) of these articles were found in the non-peer reviewed medical literature and the same proportion was found in consumer publications. Expressed from a different perspective, this means that within the peer reviewed articles found in the random sample, 33.3% (n = 6) demonstrated evidence of industry sponsorship, and 9.1% (n = 1) of all non-peer reviewed articles in the sample verified industry involvement. Furthermore, 62.5% (n = 5) of articles indicating industry ties were research-oriented articles, 37.5% (n = 3) were review style articles and there were no editorial articles in this group. Within the random sample's group of research style articles, therefore, 45.5% (n = 5) provided evidence of industry ties and within the group of all review style articles 11.1% (n = 3) demonstrated industry influence.

Findings from this content analysis fit within the range of results from recent systematic reviews, which explored potential conflicts of interest evident in the medical literature. Bekelman, Li, and Gross (2003) reported that while some studies suggest that "23% to 28% of academic investigators in biomedical research receive research funding from industry" and that "43% of investigators also receive research-related gifts" (456), others reported that 37% of National Academy of Sciences researchers had 'dual affiliations' with universities and companies and that an analysis of 789 medical articles found that 34% of lead authors had personal financial interests in their research (Bekelman, Li, and Gross 2003). In a very recently published review of randomized trials, investigators found that in 37% of reviewed randomized trials, authors declared industry funding (Bhandari et al. 2004).

The ties to industry found within the random sample confirm the relevancy of questions that have been raised in the literature about the extent of the ties between published research results and pharmaceutical companies, and their influence on outcomes. In addition, these results raise questions about the way that this information should be presented to readers of medical and consumer publications. The widely varying policies between even the most prominent medical journals (Bekelman, Li, and Gross 2003; Bhandari et al. 2004; Krimsky and Rothenberg 1998) may lead readers to assume that ties are not present if they are not stated. Despite the fact that financial ties do not in themselves imply research bias, the increasing involvement of industry in research makes it even more important that both professional and consumer information-seekers begin to understand the role of information as a commodity and that they are provided with open access to the facts that will allow them to better evaluate the information that is being communicated to them.

4.5.3 Industry and WHI Impact

Within the entire random sample, 51% (n = 25) of articles were impacted by the WHI; within the group of articles demonstrating industry ties, only 37.5% (n = 3) of articles were impacted by WHI results while 62.5% (n= 5) did not refer or allude to the WHI study. Although the smaller proportion of WHI impacted articles with industry ties may be influenced by the fact that the majority of WHI impacted articles (56%, n = 14) were review style articles whereas the majority of articles with industry ties (62.5%, n = 5) were research-oriented articles, it is possible that the decreased proportion of articles with industry ties may be related to the challenges posed to industry by research results that do not endorse a product of interest.

In recent years, the communication of information about industry sponsored research or by industry funded researchers has raised concerns due to evidence that, in some cases, negative or inconclusive results have been withheld and have not been communicated to physicians and the public. Perhaps the most well known case of industry interference with the disclosure of negative findings occurred in Toronto when Dr. Nancy Olivieri, an academic and researcher who was receiving pharmaceutical funding for drug trials, found evidence that threw into question the safety of the drug that was being investigated. The sponsoring drug company was adamant that she could neither disclose her evidence to patients nor to the scientific community and, when she chose not to comply, she was subjected to threats, loss of position, and law suits (Nathan and Weatherall 1999). Olivieri's case is not an isolated one: in 2000, the University of Toronto rescinded a job offer to a world-renowned scientist when, in a lecture at the university, he warned that a widely used antidepressant might trigger suicide in some users (Healy 2002); *The Lancet* reported that the lead investigator in a study, which demonstrated no difference in efficacy between a HIV-1 vaccine and placebo, was being sued because he and his fellow researchers "believed they had a moral duty to their patients and to the medical community to report their findings" (McCarthy 2000, 1659); and, in February 2004, the *Canadian Medical Association Journal* reported that staff at the international drug giant GlaxoSmithKline were advised in a 1998 internal document to withhold information indicating that a particular antidepressant had no beneficial effect for adolescents (Kondro and Sibbald 2004). While peer reviewed publication is of critical importance to academic researchers, the crucial point for pharmaceuticals is to achieve FDA approval; nonetheless, "publication in prestigious journals is important, to persuade physicians to prescribe the company's products" (Bodenheimer 2000, 1541). In light of the considerable barriers to publishing negative research results, publication of results from the publicly funded WHI illustrated the key importance of publicly funded research in an era of increased reliance of private research dollars.

4.5.4 Industry and Projected Tone

The majority of articles with evidence of author ties to industry or research sponsorship (60%, n = 3) projected an overall positive view of long-term preventative HT. Although the numbers were very small, these results do contrast with the proportion of all articles in the random sample that projected a definitively positive or negative tone: 41.9% (n = 13) projected an overall positive view and 58.1% (n = 18) projected an overall negative view of long-term HT. These results suggest that articles with industry ties communicated a more positive view of long-term HT than did articles without industry ties.

Observations based on the results of this exploratory study were supported by reviews of the medical literature, which have indicated that industry funding influences research findings and the presentation of results. A study exploring the financial conflicts of interest in biomedical research found that ties between industry, researchers and academic institutions were widespread and that "authors who had financial relationships with pharmaceutical companies were significantly more likely to reach supportive conclusions than authors without such industry affiliations" (Bekelman, Li, and Gross 2003, 456). Other investigations have found that trials funded by industry are "more likely to be associated with statistically significant pro-industry findings" (Bhandari et al. 2004, 477) and that "systematic bias favours products which are made by the company funding the research" (Lexchin et al. 2003, 1167). While some have demonstrated that "industry will sponsor only those research projects that are likely to be positive" (Djulbegovic et al. 2000, 635), others point out that positive research results may be the result of inappropriate comparators (Lexchin et al. 2003). Despite the complex relationship between industry, researchers and academic institutions and subsequent concerns about biased research results and the biased reporting of results, it is important to acknowledge that "without industry funding, important advances in disease prevention and treatment would not have occurred" (Bodenheimer 2000, 1543).

4.5.5 Industry and Major Themes

The majority of articles with evidence of industry ties focused thematically on 'scientific information,' while there was minimal focus on 'HT as risk' or 'health promotion,' and none of these articles focused on possible alternatives to HT (see table 12). These findings suggest that while industry is involved with the production and distribution of scientific information, the thematic focus of that information may be shaped to fit the goals of industry.

Love (2003) points out to her consumer readers that when a popular monthly health magazine ran major articles in favor of HT, there were also ads for Premarin in the same issue; when an article discussing an alternative, natural treatment for hot flashes was featured, there were no drug company funded ads included in the issue. Supported by advertising dollars, therefore, women's magazines were encouraged to include stories about the relationship between HT and osteoporosis or heart disease. A similar phenomenon can be seen in medical publications. Pharmaceutical funded research is generally "geared to end points that will allow licensing of new therapies or new uses of an existing product" (Day 2002, 361). As a result, private interests infrequently fund studies such as the WHI, a long-term study investigating health effects from a broad perspective. Day concludes that the publicly funded WHI "demonstrates that the large, long-term, complex and costly studies that are needed to assess the efficacy of primary prevention interventions require the resource and support of the public sector" (Day 2002, 361).

Table 12. Thematic focus of articles with author ties to industry

Theme	Percentage of Articles Discussing Theme
Scientific Information	62.5% (n = 5)
HT as Prevention	50.0% (n = 4)
Symptom relief	25.0% (n = 2)
Health Promotion	25.0% (n = 2)
Other	25.0% (n = 2)
Dissent prior to WHI	25.0% (n = 2)
HT as risk	12.5% (n = 1)
Dissonance post WHI	12.5% (n = 1)
HT Alternatives	0

4.5.6 Research Question 5: Summary of Results and Discussion

The complex relationship between industry, researchers and academic institutions, and ensuing concerns about the influence of industry on research results and the reporting of research findings in medical and consumer publications, made relevant the exploration of industry's influence on the articles in the random sample. Although disclosure of financial ties has been an issue of concern in medical publications for many years, this was a limited area of inquiry in the study due to the constraints of the sampling method and the fact that there is significant variation in the financial disclosure policies of journals. A minority of articles was identified as either having received direct research funding or having stated author ties to industry, and only a single article definitively stated that there were no competing interests. The majority of articles indicating ties to industry were found in medical publications and within the total number of medical articles, approximately one quarter had stated industry ties. The single consumer article with ties to industry found within the random sample turned out to be an educational, advertising section. This article was indexed as a consumer health article; however, the pdf version illustrated that despite the personal introduction from the president of a women's health organization, the 'article' was the product of a relationship between a non-profit organization and industry.

Industry ties within the random sample were primarily communicated through the declared affiliations and funding of authors; the vast majority of articles indicating industry ties identified author role. Author role is rarely identified in consumer articles; as a result, consumer articles did not communicate information about industry influence on specific articles in a way that would be apparent to readers. The majority of articles indicating author ties to industry or industry research funding were found in the peer reviewed medical literature; within the peer reviewed articles found in the random sample, one third demonstrated evidence of industry sponsorship. Findings from this study fit within the range of results related to potential conflicts of interests found in reviews of the medical literature.

Slightly more than one third of articles demonstrating industry ties were impacted by WHI results; it is possible that the decreased proportion of articles impacted by WHI results may be related to the challenges posed to industry by research results that do not endorse a product of interest. Recent evidence in the medical literature, which suggests considerable barriers to publishing negative or inconclusive research results, highlights the critical importance of publicly funded research, such as the WHI, in an era of increased reliance of private research dollars. Furthermore, the majority of articles, which presented evidence of author ties to industry or research sponsorship in this sample, projected an overall positive view of long-term preventative HT, thus suggesting that articles with industry ties communicated a more positive view of long-term HT than did articles without industry ties.

The majority of articles with industry ties focused thematically on 'scientific information,' while a minority focused on 'HT as risk' or 'health promotion.' These results suggested that while industry is involved with the production and distribution of scientific information, the thematic focus of that information may be shaped to fit the goals of industry. The publicly funded WHI study demonstrated that long-term, costly studies that assess the efficacy of established medical treatments or try to establish primary prevention interventions necessitate the resources and support of the public sector.

Results from this exploratory study, which suggest that industry may have influenced articles in the random sample, confirm the relevancy of questions about the influence of industry ties on what is printed in medical and consumer publications. Findings also raise questions about the way that information about industry sponsorship should be communicated to readers in order to allow professional and consumer information-seekers to both understand the role of information as a commodity and evaluate the information that is being communicated to them.

4.6 CONCLUSION

Through the presentation of data emerging from the content analysis of medical and consumer articles and the investigation of relationships between variables, each of the five research questions was explored and results were discussed. The literature was found to play a complex role in both the communication of information to users and, potentially, in change within medical fields. The next chapter summarizes the findings of the analyses, discusses their implications, and identifies potential for future research.

CHAPTER 5
CONCLUSION

This thesis has explored the role of medical and consumer literature in the diffusion of information related to long-term preventative hormone therapy (HT) for menopausal and postmenopausal women. In this final chapter, results of the content analysis will be summarized, theoretical and practical implications of findings will be presented, and research questions arising from this study will be discussed.

5.1 SUMMARY OF RESULTS

5.1.1 WHI Impact and the Role of the Literature in the Innovation-Decision Process

It was found that articles with characteristics of the first three innovation-decision (I-D) stages were predominantly consumer publications; they fostered a positive perception of innovation attributes, and tended to focus on symptoms or the threat of disease. Almost half of the articles in the random sample had characteristics of the implementation stage and a higher than expected proportion of these articles was published pre-WHI, in medical publications, and particularly in peer-reviewed literature. Despite the adoption of HT as a commonly used long-term preventative treatment for menopausal and postmenopausal women, it was found that implementation stage articles expressed a striking degree of uncertainty about the expected consequences of this innovation. Although the WHI played a key role in bringing the debate about long-term HT to the attention of average physicians and patients, content analysis demonstrated that the published literature played a fundamental role in elucidating post-adoption questions and moving this innovation towards the re-evaluation that occurred following the release of WHI results.

Although medical publications contributed a small majority of confirmation stage articles, all articles expressing confirmation stage characteristics were impacted by WHI findings and, as a result, post-WHI dissonance was brought both to the attention of the public and, through a noteworthy number of articles in peer reviewed publications, to the attention of clinicians. The majority of confirmation stage articles stimulated re-evaluation of long-term HT, however, articles in this stage also functioned to explore varied HT use, avoid dissonance, discuss alternatives to long-term HT, and discuss discontinuance. Although the majority of these articles presented innovation attributes in a negative light and expressed an overall negative or cautious view of long-term HT, articles presenting information that might allow the reader to avoid WHI-stimulated dissonance projected an overall ambivalent tone. Confirmation stage, dissonance-avoiding articles resembled early I-D stage articles in that they presented innovation attributes in a positive way.

Content analysis demonstrated that the WHI has influenced the information presented in medical and consumer publications and that these publications, by repeating, discussing, moulding and building on that information, may influence the views of consumers and physicians. Analysis also verified that articles have distinct qualities that may impact the I-D process through the presentation of new information, the discussion of existing information, and the shaping of information.

5.1.2 Tie Strength and the Flow of Information

Granovetter's SWT theory relates to information flow through interpersonal ties; since published articles provided a conduit through which information flowed, they can be viewed as bridging ties between networks of loosely connected individuals. For health practitioners, the role of the published literature as an information conduit has assumed even greater significance with the relatively recent focus on evidence-based practice. For consumers, published articles play an important, though less formal role in communicating medical information.

All post-WHI articles in the sample were impacted by WHI results, thus suggesting a direct association between the WHI and all subsequently published articles dealing with HT and menopause. The initial publication of WHI results in a widely read, peer reviewed journal with a comparatively high impact factor, ensured that they would receive interest and be perceived with trust by researchers and clinicians. The subsequent prevalence of post-WHI articles in both peer reviewed and consumer publications, indicated that the literature served as an effective bridging WT in bringing WHI research results and subsequent discussions to the attention of both physician and consumer populations.

Just as different types of interpersonal relationships may impact information flow, it has been theorized that different types of ties and varying levels of trust in WTs can enhance structural benefit. Analysis suggested that the following features might enhance perceived trust in the literature as it functions as a bridging WT by bringing novel information into networks: articles which provided author identity highlighted the 'expert' role of authors and thus strengthened the apparent validity of communicated information; the use of quotations brought personal names and identities into a possibly impersonal medium, thus potentially creating the perception of personal connection as well as an aura of authority when quoted individuals are perceived as 'experts'; and consumer articles made higher than expected use of a personal voice and may have thus enhanced trust by evoking a more intimate tie with readers.

The majority of confirmation stage articles were review articles. This style of article allowed a more selective and/or more personal presentation of information and, fortified by the prominent initial release of research results in *Journal of the American Medical Association*, these articles may have played a role in the rapid response, overt controversy, and behaviour change that the WHI findings evoked. These articles functioned both as critical bridging WTs between the WHI and diverse physician and consumer groups, and as the means by which evolving scientific knowledge was recorded and made available to researchers, clinicians and consumers.

Published articles provide a means by which information is communicated between medical groups, and between medical and consumer communities. The overwhelming evidence presented by diffusion and SWT research demonstrates that strong interpersonal relationships primarily cause concrete behaviour change; however, features that facilitate perceived trust can enhance the WT role of the literature as a means by which novel information travels between otherwise loosely connected groups.

5.1.3 WHI Impact on the Biomedical and Normal Life Transition Models

The biomedical paradigm dominated the sample of literature analyzed for this thesis. Despite qualitative studies demonstrating women's interest in HT alternatives and their expressed concerns about long-term HT, medical and consumer articles expressed the biomedical and normal life transition models in similar proportions and confirmed the primary influence of the biomedical model on both medical and consumer publications. Findings did, however, demonstrate that following the publication of WHI results, the proportion of normal life transition articles increased. All articles in the first three I-D stages presented the biomedical model; the proportion of articles presenting the normal life transition model increased in implementation and again in confirmation stage articles. The WHI did, therefore, appear to have influenced basic conceptions of women's health and well-being in a small proportion of the published literature. Although the majority of all articles expressed the biomedical model, the proportion of articles expressing the normal life transition model increased when the innovation attributes of long-term preventative HT were presented in a negative light. The publication of WHI findings not only provided physicians and women with information that demanded a re-evaluation of long-term HT, it also facilitated an increased level of discussion about menopause within the context of a normal life transition.

5.1.4 Expression of the Medicalization of Menopause

Relationships between variables used in the content analysis of medical and consumer articles clearly expressed the medicalization of menopause. Long-term preventative HT had been promoted to potential adopters primarily on the basis of three disease processes: osteoporosis, cardiac disease, and Alzheimer's disease or cognitive decline. Based on the medicalized view of menopause, which had emerged over the last century, these diseases came to be viewed as *symptoms* of hormone deficiency and thus as the primary rationale for the long-term use of HT by healthy menopausal or postmenopausal women.

The majority of articles in the sample discussed symptoms and diseases that have been linked to menopause and more than half of this group explicitly or implicitly presented the assumption that undesirable *symptoms* are associated with the menopausal or postmenopausal years. A higher than expected proportion of consumer articles discussed *symptoms* and presented the *symptom*-menopause assumption, thus suggesting that consumer articles played a role in shaping menopause-related information and reinforcing a medicalized view of this life stage. The lower than expected number of post-WHI articles communicating the *symptom*-menopause assumption suggested that the WHI, by challenging the assumed benefits of long-term preventative HT and its relative advantage, impacted expression of the *symptom*-menopause assumption. Articles discussing *symptoms* had a lower than expected thematic focus on the potential risks of HT and 'scientific information,' and a greater than expected focus on the relief of symptoms and prevention of chronic disease; articles expressing the *symptom*-menopause assumption presented an overall positive view of HT. These results expressed the medicalization process whereby menopause was defined in medical terms and, as a result, alleviation of menopause-caused deficiency and supposed subsequent *symptoms* became an imperative. Articles, therefore, appeared to function not merely as information channels; they also functioned to communicate the ideological framework that assumed a medicalized view of menopause.

The sequential presentation of symptoms and maladies that characterized the medicalization of menopause was demonstrated by analysis of the sample: almost three quarters of the articles discussing menopause *symptoms* referred to osteoporosis and cardiac disease, while slightly less than half of these articles discussed the relationship between dementias and cognitive decline, and menopause. Thematic focus of osteoporosis-related articles suggested that the view of osteoporosis as a *symptom* of estrogen deficiency was so well established that the wider scope of options related to prevention and management of this malady were largely ignored in the literature. The decisive impact of the WHI study on HT role, innovation attributes, and overall view of HT was made evident by the content analysis of both medical and consumer articles. Among those articles not impacted by the WHI, a higher than expected number presented HT as cardio-protective, the innovation attributes of HT were presented positively, and HT was presented in an overall positive light. On the other hand, a higher than expected number of WHI impacted articles discussed HT as a cardiac risk factor, only a small number presented positive attributes of this therapy, and these articles presented an overall negative view of long-term preventative HT. The latest additions to the list of health problems that long-term HT promised to assuage were Alzheimer's disease, other dementias and cognitive decline. Cognitive dysfunction was primarily discussed within the context of osteoporosis and/or cardiac disease, other maladies that many considered to be *symptoms* of estrogen deficiency, thus demonstrating the increasing trend towards the medicalization of women's health and the aging process. The noteworthy proportion of articles discussing osteoporosis, cardiac disease, and/or cognitive decline and also discussing various cancers demonstrated that at the same time as HT was being viewed as the potential solution for health problems, cancer was an important factor in the interplay of benefit and risk that shaped HT discussions.

Medicalization, as expressed in this sample, also was demonstrated as a progressive phenomenon that manifested itself differently throughout the I-D process. Articles in the first three I-D stages discussed *symptoms*, communicated the *symptom*-menopause assumption, and presented information that would stimulate HT adoption. Fewer implementation stage articles than expected discussed *symptoms*; instead, these articles primarily discussed post-adoption problems and issues related to HT use. By raising questions about the efficacy and safety of long-term HT, these articles inadvertently challenged the medicalized view of menopause presented by articles in previous I-D stages. The *symptom*-menopause assumption was expressed by a smaller number of confirmation stage articles than expected and, among those confirmation stage articles discussing the role of HT, only a minority of articles portrayed HT as being cardio-protective.

The medicalization of menopause was expressed in the sample by the relationships between published articles and *symptom* discussion, the prevalence of the *symptom*-menopause assumption, discussion of specific diseases that have been linked to menopause as *symptoms* of estrogen deficiency, and the interplay of variables with the I-D stages of long-term HT. Content analysis demonstrated that the medicalization of this life stage influenced and shaped the way information was presented in the random sample.

5.1.5 The Influence of Industry on Articles

Although a limited area of inquiry in this study, the complex relationship between industry, researchers and academic institutions, and ensuing concerns about the influence of industry on research and published research results, made relevant the exploration of industry's influence on the medical and consumer articles in this sample. The vast majority of articles with industry ties identified author role, and ties were primarily communicated through the declared affiliation and funding of authors. Within the total number of medical articles in the sample, approximately one quarter had stated industry ties; one third of peer reviewed medical articles demonstrated evidence of industry sponsorship. The single consumer article with stated industry ties turned out to be an educational, advertising section, which was the product of a relationship between a non-profit organization and industry. The overall positive view of long-term HT projected by the majority of articles with ties to industry suggested that articles with industry ties communicated a more positive view of medical intervention than did articles without industry ties. Results of this study fit within the range of results related to potential conflicts of interests found in reviews of the medical literature, and observations of positive tone in articles with industry ties were supported by reviews indicating that industry funded research has been statistically linked to pro-industry findings.

The fact that a minority of WHI-impacted articles demonstrated industry ties may demonstrate the challenges posed to industry by research results that do not endorse a product of interest. Recent incidents recorded in the medical literature indicate that there are substantial barriers to publishing negative or inconclusive results from industry funded studies. In addition, the minimal focus of articles with industry ties on the potential risks posed by HT and on health promotion suggested that, although industry is involved in the production and distribution of scientific information, published information may be shaped to fit the goals of industry. These issues draw attention to the critical importance of publicly funded research, such as the WHI, in an era of increased reliance on private research dollars.

Content analysis suggested that industry may have influenced articles in the random sample and confirmed the relevancy of questions related to the influence of industry ties on medical and consumer publications. Consistent identification of industry involvement in research or of financial ties of authors to industry should become standard practice as communication of this information to professional and consumer information-seekers is critical in order to allow readers to both understand the role of information as a commodity, and evaluate the information that is being communicated to them.

5.2 IMPLICATIONS OF STUDY RESULTS

This study, which explored the role of medical and consumer literature in the diffusion of medical information, has both theoretical and practical implications for libraries and information professionals. Implications relate to the following three points: (1) published literature plays an integral role in the diffusion of innovations; (2) medical and consumer articles are not neutral information channels, they also play a role in shaping information; and (3) medical science is dominated by the biomedical model, therefore, both physicians and patients should be made aware that information is not neutral and that philosophical underpinning impacts information.

5.2.1 Theoretical Implications

Fundamental to every diffusion process is the spread of information concerning innovations to members of a social system (Kortelainen 1997); thus, diffusion of innovation is integrally tied to the communication channels that carry information to potential adopters. The medical community represents a unique type of social system because physicians may function as both researchers and clinicians. Published medical information, a primary means by which new ideas are spread within the medical community, thus performs two frequently overlapping roles in the diffusion of innovative ideas and practices: (1) it contributes to and records the accumulation of knowledge that contributes to innovation development; and (2) it facilitates the decision-making process as potential users gather and evaluate information about the innovation (Landrum 1998a). Consumer literature is also an important part of the diffusion of medical innovations, as consumer health articles communicate information about treatments and medications to readers who may be potential adopters through their choice to comply with prescribed treatments. While immediate behaviour change most frequently occurs as a result of interpersonal interactions, medical and consumer articles play a decisive role by creating a vital communication network that carries novel information between physician groups and between physician and consumer communities. The impact of the published literature and the role it plays in the diffusion process is related to many factors, including the following: the recorded process by which data are collected, the formats in which data are presented to readers, the integration of new data with existing information, the credentials and authority of authors, the perceived tone of the article, and the thematic focus.

While there is a tendency to view medical and consumer articles as passive representations of fact, the view of literature as a WT in the multifactor communication network involved in diffusion allows for a more comprehensive understanding of the role of published literature. Furthermore, this content analysis suggested that the literature is not a neutral channel through which information merely passes between loosely connected groups; articles not only provide information, they produce and shape meaning. Consumer articles, for example, demonstrated the role of the literature in shaping information: these articles were concentrated in the first three I-D stages, they focused on the positive attributes of long-term HT and on *symptoms* associated with menopause, and they presented an overall positive view of this therapy. Both the published literature and the findings of this study suggested that the increasing involvement of industry in research also functions to shape the presentation of data. Information professionals should be aware of and should maintain a critical view of the way that the WTs created by the literature may be moulded.

Despite the assumption that the biomedical model is inherently neutral from a philosophical perspective, this model facilitates a medicalized view of women's health. The predominance of the biomedical model, the paucity of articles expressing the normal life transition model, and the increasing trend towards the medicalization of women's health, negatively impacts women as it defines women as having innate physical flaws that require medical intervention. In addition, little diversity in perspective is provided to those who wish to pursue non-medicalized treatment options. Publicly funded research helps move beyond a medicalized view of health because it facilitates not only the exploration of specific treatments and medications, it allows researchers to explore primary prevention interventions that may not have commercial value. Such primary disease prevention not only has the potential to decrease overall health spending, it also responds to women's needs for alternative approaches of health care and to their apprehensions about lifespan medicalization.

Perhaps the most pertinent analogy for the theoretical implications of the published literature is the fallopian tube. Once considered a mere conduit through which the ovum passed down towards the uterus to be potentially met midway by ascending sperm, it is now understood that the fallopian tube is, in itself, a complex structure. Carefully regulated mechanisms attract the newly released ovum from the ovary into the upper end of the fallopian tube; through coordinated movement of the cilia, the ovum and sperm are ushered towards one another; precise temperature regulation ensures that the gametes are optimally prepared for a potential encounter; and the biochemical milieu within the fallopian tube prepares the surface of the ovum for potential contact. All of these complex, and yet commonly overlooked activities, make possible the very process of fertilization, which, after an appropriate incubation period, produces a readily apparent outcome. In a similarly complex ways, the literature functions, frequently behind the scenes, to provide information, reinforce knowledge, produce and shape meaning, and create belief.

5.1.2 Practical Implications

Because Library and Information Studies (LIS) is a discipline that "... was born out of professional practice and is therefore intimately connected with its problems" (Jarvelin and P. Vakkari 1990, 415), it is not surprising that in much of the LIS literature innovation is directly tied to products or services and relates to the adoption of new approaches or the application of new technologies to traditional functions. Forward thinking librarians are, however, beginning to see innovation in libraries within a broader framework as the essential role of libraries (as stewards of knowledge infrastructures and partners in research and development) becomes more apparent (CLA Task Force on the Innovation Strategy 2002). From this perspective, libraries can be seen to play a potentially pivotal role in innovation development and diffusion. In addition to the theoretical implications of this thesis study, there are a number of practical implications that can be drawn from the results, observations, and discussions.

Despite common assumptions that scientific information presented in medical and consumer articles is factual and verifiable, it critical that libraries and information professionals in scientific fields seek to facilitate access to the diversity of information that informs human knowledge. This may involve careful evaluation of complementary and alternative medicine collections as well as attention to feminist voices and concerns. Granovetter (1982) points out that change is more likely to originate in the margins of scientific networks; therefore, it is critical that libraries play a role in facilitating access to information in the margins. Information, particularly in medical fields, must be viewed as a 'work in progress.'

A current dilemma that is impacting the ability of librarians to select the most appropriate and diverse materials for their users is the move towards journal 'bundling,' "the practice of aggregating all titles produced by a publisher into a single product, or subject-based subsections" (Nabe 2001). This increasingly popular subscription practice of academic libraries raises serious concerns: important collection development decisions are surrendered as large monopolizing publishers bundle essential journals with non-essential publications, add and delete content from databases without the input of subscribers, and dictate the journal retention decisions of subscribing libraries; non-profit societies or university presses are threatened by the increasing power of commercial publishers to control the information market; and, perhaps most importantly, libraries are being restricted in their ability to facilitate information transfer to non-university individuals and institutions, thus undermining the role of the research literature as a public resource that can aid economic and social progress (Frazier 2001; Nabe 2001). This study has highlighted the role of the literature as an active participant in innovation diffusion. Libraries and information professionals must retain the freedom to provide their users with access to all types of information and a diverse range of literature that is selected by professionals who have working knowledge of the user community.

Since the literature and the findings of this study demonstrate industry involvement in the presentation of information through medical and consumer publications, and since the literature functions not merely to deliver but also to shape knowledge, the importance of non-commercial involvement in compiling consumer health information is critical. Within the context of a publicly supported health care system, the presentation of health-related information to consumers should retain some aspect of public responsibility. This highlights that libraries should not be merely "store-and-forward" (Lindquist 1999) facilities, they have a role to play as active participants in the collection and organization of information into formats that are balanced and useful to users, in addition to being free from commercial influence. In this way, libraries can a play a role in facilitating the 'trusted' WT role of the literature. In addition, just as journals are struggling to find the appropriate way in which authors should disclose information about industry ties, new dimensions of description should be incorporated into cataloguing practices so that this information is visible to those accessing information electronically.

The biomedical model and the medicalization of women's health are entrenched within the generally accepted and understood context of medical research. This is changing as medical authors and groups begin to incorporate research from the social sciences into the body of knowledge that forms the basis for clinical practice (Flint and Samil 1990; Shtarkshall et al. 2002). Although it is recognized that well designed systematic reviews and meta-analysis (Egger, Smith, and Phillips 1997) are valuable tools for evaluating the published literature as a whole, it is important to recognize that a variety of research methods will best serve clinicians and patients by allowing the expression of diverse philosophical models and varied perspectives. Information obtained from qualitative research and some quantitative methods cannot be easily combined for meta-analysis, and yet they make important contributions to knowledge and allow the expression of views that do not fit within the biomedical context. A qualitative study of primary care physicians, for example, found that evidence based medicine was associated with randomized controlled studies or systematic reviews, and that doctors were unaware of evidence from qualitative research (Freeman and Sweeney 2001).

Examination of texts is "extremely beneficial as a means of highlighting representations of an issue that are dominant at a particular time" (Lyons and Griffin 2003, 1640) and content analysis is a useful means by which both quantitative and qualitative information presented in medical and consumer publications can be evaluated and understood as a whole. Information professionals in scientific fields can help to bring awareness of diverse research methods and their potential role in the accumulation of holistic scientific knowledge to both researchers and clinicians. Librarians working with lay individuals of all ages can facilitate the use of scientific publications or the use of consumer health information by teaching users to seek varying perspectives and diverse resources, and to critically evaluate the information they access.

5.3 RESEARCH QUESTIONS ARISING FROM THIS STUDY

At the same time as demonstrating the complex role of published literature in the communication of medical information to physicians and consumers, this study raises questions that suggest topics for future research. Primary areas of potential investigation relate to how professionals and consumers use and interpret information, the transfer of information between medical and consumer groups, and the impact of blurred boundaries between education and product promotion.

This study explored the role of the published literature within the I-D cycle of long-term preventative HT. While content analysis allows a statistical evaluation of frequencies and significance, future research should undertake to evaluate how real people access, use and interpret information about controversial or changing areas of medical practice. For example, how did HT users learn about WHI results and what use did they make of this information once they found it?

What tools or thought processes did women utilize in determining their response to this information? And, what resources were important for this process? It would also be valuable to explore the degree to which a medicalized view of women's health shapes the way in which women seek information, the resources they choose to use, and the questions they ask.

This study also found that despite the communication of important HT-related questions in implementation stage articles and their relationship to the theme 'HT as risk,' HT was being prescribed at increasing rates and articles in medical publications were exploring how to increase the compliance of women with this therapy. This suggests that prescription patterns were being influenced by other sources of information and stronger ties within physician networks. Some research, for example, has suggested that throwaway publications (Rochon et al. 2002) and publications from symposiums (Schwartz, Woloshin, and Baczek 2002) are having an undue influence on clinical practice. Further investigation of these influences, particularly in the area of women's health, and their impact on specific issues (such as the widespread adoption of long-term HT in the absence of evidence for efficacy and safety) is warranted. It would also be interesting to investigate whether the dissemination of dissonance-creating medical information, such as the WHI results, impacts the underlying attitudes of physicians and lay people, or whether it merely produces a momentary pause in the ongoing medicalization of normal life processes.

Questions related to information transfer between medical and consumer groups warrant future study. There are studies that elucidate this area: Moynihan et al. (2000) explored media representations of three medications, and Woloshin and Schwartz (2002) found that press releases from medical journals exaggerated the perceived importance of findings while not highlighting study limitations or industry funding. Research, however, into the completeness and quality of consumer health articles, assessment of how consumers use this information, and investigation into the impact of this information on the way that individuals approach personal health, may assist in improving the communication of medical information to lay populations and may facilitate individuals as they deal with the medical system. Furthermore, an evaluation of scientific citations following media coverage of research findings revealed that coverage of medical research in the popular press resulted in an increased number of citations to the original research in the 10 years following press coverage (Phillips et al. 1991). Given the impact of press coverage on scientific citations, it would be valuable to explore how consumer publications impact aspects of clinical research, for example, the acknowledged gap between consumer need and interest, and clinical research (Heymann 1995; Liberati 1997; Tallon, Chard, and Dieppe 2000). The impact of consumer publications on primary care physicians and on their interactions with patients is also an area that warrants consideration.

Finally, the boundaries between medical education and the promotion of products are becoming increasingly blurred (Moynihan 2003a). This is occurring not only in medical publications but also in the lay press as pharmaceutical and biotechnology firms directly sponsor 'newsmagazine' style presentations across mediums (National Women's Health Network 2002; Seaman 2003). This area of concern is just beginning to be discussed in medical publications; it would be valuable to investigate the understanding of individual clinicians with regard to the potential impact of industry on the 'factual' information they rely on for medical education. Evaluation of educational materials used by doctors with patients should also be an area of investigation as, despite the availability of publicly funded health resources, many doctors rely on handouts from industry for patient education.

5.4 CONCLUSION

Using content analysis, this study explored the role of medical and consumer literature in the diffusion of information related to long-term preventative HT for menopausal and postmenopausal women. Informed by Rogers' Diffusion of Innovations theory (Rogers 1995) and Granovetter's SWT theory (Granovetter 1973), the following topics were investigated: the impact of the WHI study on a random sample of medical and consumer articles published between 1999 and October 2003, and the role played by the literature in the I-D process related to long-term preventative HT; the role of varying tie strength in the flow of novel information between loosely connected medical groups and between medical and consumer communities; the impact of the WHI on the expression of the biomedical and normal life transition models within the literature; the expression of medicalization within the sample of medical and consumer articles; and evidence of the influence of industry on articles in the sample. It was found that despite the relative neglect of the published literature in diffusion research, medical and consumer literature plays an integral role in the diffusion of innovations by creating a vital communication network that carries novel information between physician groups and between physician and consumer communities. Moreover, medical and consumer publications are not merely a neutral means by which information is communicated; published articles provide information, reinforce knowledge, produce and shape meaning, and create belief. Despite the assumption that the biomedical model is inherently neutral from a philosophical perspective, the predominance of a medicalized view of women's health highlighted the importance of publicly funded research that facilitates not only the exploration of specific treatments and medications, but also allows researchers to explore primary prevention interventions that may not have apparent commercial value. Since information professionals play a distinctive role in managing information and facilitating user access to diverse and high quality resources, a greater understanding of the complex role of medical and consumer articles, particularly in controversial or changing areas of medical practice, will allow librarians to actively facilitate research and development within scientific fields, and to help professionals and consumers understand the role of information as a commodity and effectively evaluate the information that is being communicated to them.

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APPENDIX A
CONSUMER AND MEDICAL ARTICLES IN STRATIFIED RANDOM SAMPLE

Consumer Pre-WHI Articles

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Spake, Amanda. 2002. A natural way through menopause? *U.S. News & World Report*, 21 January, 56.

Consumer Post-WHI Articles

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Anonymous. 2003. Hot stuff. *A Friend Indeed*, January-February, 8.

Anonymous. 2002. More harm than good? *Maclean's*, 22 July, 36-7.

Anonymous. 2002. The hormone option. *Maclean's*, 10 July, 14.

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Fragakis, Allison Sarubin. 2003. What now for hot flashes? "Estrogens" in soy may stand in for hormone therapy. *Prevention*, February, 65-6.

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Kalb, Claudia. 2002. A natural way to age: Worried about the safety of hormone-replacement therapy, women are wondering how to deal with menopause. *Newsweek*, 2 December, 64.

Levine, Samantha. 2002. Tailor-made treatments. *U.S. News & World Reports*, 18 November, 61.

O'Grady, Kathleen. 2002. The menopause wars: HRT in the spotlight. *A Friend Indeed*, September-October, 1-3.

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Shuchman, Miriam. 2002. Guidelines on changing course: If menopause symptoms are really bad, one expert says, hormone replacement therapy might still make sense. *Globe & Mail*, 16 July, 1.

Spake, Amanda, Susan Headden, Katy Kelly, Staff, The U.S. News Library, and Nancy Cohen. 2002. The menopause marketplace. *U.S. News & World Report*, 18 November, 42.

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Medical Post-WHI Articles

Al-Badr, A., S. Ross, D. Soroda, and H.P. Drutz. 2003. What is the available evidence for hormone replacement therapy in women with stress urinary incontinence? *Journal of Obstetrics & Gynaecology Canada* 25, no. 7: 567-74.

Collins, J.A. 2002. Tipping the balance: The WHI study and the benefits and risks of hormone replacement therapy. *Journal of Obstetrics Gynaecology Canada* 24, no. 9: 683-8.

Griffiths, F. 2003. Taking hormone replacement therapy. *British Medical Association Journal* 327, no. 7419: 820-1.

Hodges, David. 2002. More cancer woes for estrogen therapy: Single therapy linked to increase in ovarian cancer risk. *Medical Post*, 30 July, 1.

Manzer, Jenny. 2002. HRT should not be prescribed for disease prevention, guidelines say. *Medical Post*, 8 October, 2.

Manzer, Jenny. 2002. New tool for HRT: Menopause panel's report offers basic recommendations for clinical practice. *Medical Post*, 15 October, 1.

Murray, Terry. 2003. Menopause may fake allergy symptoms. *Medical Post*, 1 April, 17.

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Pradhan, A.D., J.E. Manson, J.E. Rossouw, D.S. Siscovick, C.P. Mouton, N. Rifai, R.B. Wallace, R.D. Jackson, M.B. Pettinger, and P.M. Ridker. 2002. Inflammatory biomarkers, hormone replacement therapy, and incident coronary heart disease: Prospective analysis from the Women's Health Initiative observational study. *Journal of the American Medical Association* 288, no. 8: 980-7.

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Sylvester, Bruce. 2002. HRT risks outweigh benefits, study concludes: Women's Health Initiative trial stopped by fears of breast cancer, coronary heart disease, stroke. *Medical Post*, 30 July, 20.

Wright, J.M., V. Musini, M. van Breemen, and C.D. Jauca. 2003. Update on combined HRT. *Canadian Family Physician* 49 (May): 599.

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APPENDIX B
VARIABLES AND VALUES

Variables and Values **Definitions of Values**

Article Number 1, 2, 3, … (each article has unique number)

Audience

Consumer article	1		
Medical article	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

Pre/Post WHI

Month/year will also be noted

Pre-WHI	1		
Post-WHI	2		

Impact of WHI study

Not cited/mentioned	1		Results of the WHI study not mentioned or cited in article.
Cited/mentioned	2		WHI results are cited or directly identified, or are referred to indirectly or alluded to.

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

Publication Type

Medical, peer reviewed	1		Article is intended for a medical audience and is published in a peer-reviewed medical journal.
Medical, not peer reviewed	2		Article is intended for a medical audience and is published in a medical publication that is not peer-reviewed.
Consumer	3		Article is intended for a lay audience.

This variable analyzed and used in the following research questions: 2, 5

Article Type

Research	1		Article reports formal research and includes elements of research reports including evidence of research method.
Review	2		Reviews findings of previously published research; may be formal review article or informal review of research results.
Editorial	3		Editorial style. Either titled or identified by database indexing as an editorial, or it is in a clearly editorial or opinion style.

This variable analyzed and used in the following research questions: 2, 5

Innovation-Decision Process

Definitions based on Rogers (1995, 161-203). Supplemental pages provided expanded definitions of variables.

Knowledge Acquisition

Article facilitates awareness knowledge, how-to-knowledge, or principle knowledge.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4

Persuasion

Persuades by presenting innov-evaluation info; innovation attributes frequently positively highlighted at this stage.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4

Decision

Article presents information which will facilitate adoption or rejection of HT. Trialability of innovation may be emphasized.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4

Implementation

Innovation-decision process moves from mental activity to reality.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4

Confirmation Article will include information related to reinforcement of adoption decision, dissonance, and discontinuance

Yes	1		Do following section "Confirmation Stage Details."
No	2		Skip following section "Confirmation Stage Details."

This variable analyzed and used in the following research questions: 1, 2, 3, 4

Confirmation Stage Details

Avoids Dissonance Provides info that helps reader avoid feelings of dissonance; discusses WHI limitations and/or limited application of WHI

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2

Stimulates Re-evaluation Provides information that stimulates or discusses re-evaluation of prescribing or using HT for long-term prevention

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2

Discusses Discontinuance Article suggests or discusses discontinuance of HT as a preventative therapy for women

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2

Varied HT Use Suggests or discusses varied use of HT – for example, for shorter periods of time and in lower doses, limited use for symptoms as opposed to for prevention, or different delivery routes/doses.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2

Alternatives to HT Article suggests or discusses alternative to HT for symptoms associated with menopause.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2

Innovation Attributes

Definitions based on Rogers (1995, 204-51). Articles that do not address a given attribute are excluded.

Relative Advantage

Yes - rel. adv. for adopters	1		Article promotes or highlights the relative advantage of using/prescribing HT.
HT does not have rel. adv.	2		Article promotes/highlights that HT does NOT have a relative advantage over other options or non-treatment.

This variable analyzed and used in the following research questions: 1, 3, 4

Compatibility

Yes - HT compatible for adopters	1		Facilitates HT adoption by noting, promoting or demonstrating (explicitly or implicitly) that HT is consistent with beliefs,
			values and/or needs of potential adopters reading the article.
HT not compatible	2		Article promotes/highlights that HT is NOT compatible with the beliefs, values or needs of adopters.

This variable analyzed and used in the following research questions: 1, 3, 4

Complexity

Yes - decreases complexity	1		Facilitates HT adoption by promoting, highlighting or demonstrating features of HT for long-term prevention that
			decreases this therapy's perceived complexity or clarify its use.
HT more complex than simple	2		Article presents information that increases perceived complexity thus NOT facilitating adoption.

This variable analyzed and used in the following research questions: 1, 3, 4

Trialability

Yes - trialability for adopters	1		Article facilitates HT adoption by highlighting or demonstrating that HT can be tried without full commitment to adoption.
HT is NOT easily trialable	2		Article promotes/highlights that HT is NOT easily trialable on a limited basis.

This variable analyzed and used in the following research questions: 1, 3, 4

Observability

Yes - observable for adopters	1		Facilitates adoption by increasing degree to which the results of long-term HT are visible or observable to the reader.
HT is NOT easily observable	2		Article promotes/facilitates rejection of long-term HT by highlighting/demonstrating that positive benefit is not observable.

This variable analyzed and used in the following research questions: 1, 3, 4

Projected Tone Regarding HT

Articles with overall neutral tone or balanced presentation were excluded. Incidental disclaimers not graded as neutral.

Positive	1		Article expresses an overall positive view of HT as a long-term, preventative therapy for menopausal women.
Negative/cautious	2		Article expresses an overall negative or cautious view of HT as a long-term preventative treatment for menopausal women.

This variable analyzed and used in the following research questions: 1, 3, 4, 5

Voice of Article

Personal	1		Article addressed reader in personal way (e.g. "you") or author uses the first person.
Impersonal	2		Article used impersonal voice; author uses the 3rd person.

This variable analyzed and used in the following research question: 2

Author Role

(1st author)

Identified	1		Author credentials are given. This was associated with 'expert' status.
Undetermined	2		Author credentials not given

This variable analyzed and used in the following research question: 2

Who is Being Quoted?

Expert

Quoted individual is a physician, specialist physician, professor, researcher or has been identified as "Dr. X."

Yes	1		
No	2		

This variable analyzed and used in the following research question: 2

Industry Representative

Quoted individuals with discernable ties to industry will be categorized here even if they also fit other categories.

Yes	1		
No	2		

Gov't or Med Society Rep.

Quoted individuals who represent government organizations or medical society/organization will be categorized here.

Yes	1		
No	2		

This variable analyzed and used in the following research question: 2

Endorsing User

A user of HT is quoted, the user is satisfied, endorses, or is positive about the use of the therapy.

Yes	1		
No	2		

Non-endorsing User

A user of Ht is quoted, the user is cautious, not satisfied, questioning or negative about HT.

Yes	1		
No	2		

Symptoms

Symptoms Discussed

Yes	1		Article discusses or mentions *symptoms* , which are associated with menopause or the postmenopausal years.
No	2		Article does NOT relate to or discuss *symptoms* experienced by menopausal/postmenopausal women. Skip section.

This variable analyzed and used in the following research question: 4

Assumption of Meno-*symptoms* Association

Yes	1		Explicitly or implicitly presents the assumption the menopause/postmenopause is associated with undesirable *symptoms*
No	2		Article does NOT present the assumption that menopause is associated necessarily with undesirable *symptoms* .

This variable analyzed and used in the following research question: 4

Not All Women Have or Are Troubled By *Symptoms*

Yes	1		States/provides data indicating that not all women experience, or are troubled by undesirable *symptoms* during meno/post
No	2		Article does not specifically mention that not all women have or are troubled by undesirable *symptoms* during this time.

This variable analyzed and used in the following research question: 4

Osteoporosis Article mentions or discusses osteoporosis and its relationship to menopause/postmenopause.

Yes	1		Mentioned or discussed.
No	2		Not mentioned or discussed.

This variable analyzed and used in the following research questions: 3, 4

Cardiac Symptoms Article discusses cardiac symptoms and their relationship to menopause/postmenopause

Yes	1		Mentioned or discussed.
No	2		Not mentioned or discussed.

This variable analyzed and used in the following research questions: 3, 4

Cognition or Dementia Article discusses symptoms relating to cognition or dementia and their relationship to menopause/postmenopause

Yes	1		Mentioned or discussed.
No	2		Not mentioned or discussed.

This variable analyzed and used in the following research questions: 3, 4

Vasomotor Symptoms (e.g. Hot Flashes, Night Sweats)

Yes	1		Mentioned or discussed.
No	2		Not mentioned or discussed.

Other Article discusses symptoms related to menopause which are not listed above. Specific symptoms will be noted.

Yes	1		Mentioned or discussed.
No	2		Not mentioned or discussed.

HT Role

HT used in the general sense for estrogen or combined estrogen-progestin treatment (studies related to estrogen only are still being published).

Osteoporosis Articles not indicating protective or risk role were excluded.

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

This variable analyzed and used in the following research question: 4

Cardiac Disease

Articles not indicating protective or risk role were excluded.

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

This variable analyzed and used in the following research question: 4

Dementia or Cognitive Decline

Articles not indicating protective or risk role were excluded.

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

This variable analyzed and used in the following research question: 4

Cancer

Breast Cancer

Yes	1		Breast cancer is mentioned or discussed.
No	3		Breast cancer is not mentioned or discussed. Skip next question.

This variable analyzed and used in the following research question: 4

HT Role Related to Breast Cancer

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

Ovarian Cancer

Yes - focused discussion	1		Ovarian cancer is mentioned or discussed.
Yes - noted/mentioned	2		Ovarian cancer is not mentioned or discussed. Skip next question.

HT Role Related to Ovarian Cancer

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

Uterine/Endometrial Cancer

Yes - focused discussion	1		This cancer is mentioned or discussed.
Yes - noted/mentioned	2		This cancer is not mentioned or discussed. Skip next question.

This variable analyzed and used in the following research question: 4

HT Role Related to Endometrial Cancer

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

Colorectal Cancer

Yes - focused discussion	1		This cancer is mentioned or discussed.
Yes - noted/mentioned	2		This cancer is not mentioned or discussed. Skip next question.

This variable analyzed and used in the following research question: 4

HT Role Related to Colorectal Cancer.

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

Other or Unspecified Cancers

Type of cancer will be noted if given.

Yes - focused discussion	1		This cancer is mentioned or discussed.
Yes - noted/mentioned	2		This cancer is not mentioned or discussed. Skip next question.

HT Role Related to Other or Unspecified Cancers.

HT Role: Protective or beneficial	1		
HT Role: Risk factor	2		

Biomedical Model vs. Normal Life Transition Model

Biomedical model	1		Article reflects the view that the body is machine-like and can be 'fixed' with appropriate medical intervention. Menopause
			is viewed as a deficiency disease that requires medical regulation and supervision.
Natural life event model	2		Article treats menopause as a naturally occurring phase of life, which is situated within a socio-environmental context.
			Medical assistance may be sought for specific physical problems but the life phase is not viewed as an illness.
Equal treatment	3		Article gives equal attention to the two models.

This variable analyzed and used in the following research question: 3

Major Theme of Article

Scientific Info re HT

Factual information about scientific findings relating to HT.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

HT for Symptom Relief

Article focuses on HT as a means for symptom relief or control (e.g. hot flashes, night sweats, insomnia etc).

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

HT as Preventative Therapy

Article focuses on HT as a long-term preventative therapy.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

General Health Promotion

Article focuses on promoting health in during menopause/post-menopause rather than on symptoms elimination.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

Symptom Relief, Alternatives to HT

Articles focuses on relieving symptoms but highlights alternative to HT such as diet or exercise.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

Dealing with Dissent pre-WHI

Dealing with dissent about HT in light of various research findings in the pre-WHI time period.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

HT as Health Risk

HT as a real or potential risk to health.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

Dissonance post-WHI

Dealing with dissonance in the wake of WHI.

Yes	1		
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

Other

Yes	1		Note theme
No	2		

This variable analyzed and used in the following research questions: 1, 2, 3, 4, 5

Industry Sponsorship

Yes	1		Disclosures or other indication that the author(s) has ties to industry or that the article received industry sponsorships.
No or uncertain	2		States that there has been no funding from industry, or there is no indication of industry funding or the lack thereof.

This variable analyzed and used in the following research question: 5